THE
# ELECTRICAL REVIEW.

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## ELECTRICAL REVIEW.

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## SALES PROMOTION.

IN the past, the chief source of weakness in the British commercial machine has been in the sales section, rather than in the manufacturing. Taken all round, British manufacturing has no superior in the world, whatever may have been lacking in adaptability to the requirements of particular markets, but our selling capacity has not always attained the same high standard of excellence.

What apparently has been wanted in the past in some large commercial houses is a Sales Promotion Department. It is true, of course, that the majority of enterprising firms have spent considerable sums of money on advertising, representatives and agents, foreign trade propaganda, and other sections, which, taken collectively, form the chief constituents of a Sales Promotion Department; but too often these several interests, which have a vital connection with each other, have been exploited on their individual merits, rather than collectively, with the result that they have not given each other reasonable and practicable support. In many cases their merits, either collectively or individually, have never been realised at all.

A highly efficient Sales Promotion Department should, we suppose, have the control and direction of the following sections:—Press advertising, and all advertising matter; representatives and agents, both home and foreign; shipping section promotion; security of credit; trade marks; printing and stationery, &c.

Each of these several interests possesses a vital connection with the others, and, if full benefit is to be derived from them, they should be controlled by one responsible head, and one policy should direct the whole. In the advertising section full benefit is not attained by a large proportion of advertisers. A glance through our own advertising pages will show that many of our firms are to-day publishing matter which is distinctly business-like and useful to purchasers. There is a decided improvement as compared to several years ago; but even here, and certainly in many other trade journals with which we are familiar, advertisers are too often content to make their advertisements merely announcements that they are manufacturers of this or that class of goods for which, if the buyer cares to make inquiries, he can have a quotation. The chief space is devoted to a display of the firm's name, rather than of the goods themselves and the reason why they are likely to be what the buyer wants. The fault appears to be due to the fact to which we have already referred on several occasions—that the advertising section is regarded as of secondary importance, and is allowed to drift into the hands of a member of the staff who does not possess sufficient knowledge of this highly important branch of commercial enterprise.

When, however, full benefit is derived from the Press advertising section, another equally important section, in consequence, receives a great impetus from the support afforded—the representative and agents' section. Every successful commercial traveller admits that an efficient Press advertising organisation is the best support he could ask for. It is his best medium of introduction, his most influential advocate, and at all times his sturdy pioneer over rough and personally uncultivated ground. The advertising section and the representative section are, therefore, mutual in effect, and continually contribute to each other's influence.

A great future for foreign trade will doubtless open out for British manufacturers after the war. This section, however, is one which we believe can only yield satisfactory results if conducted on sound business lines. It certainly ranks as one of the most important sections of the

Sales Promotion Department. Very little service is to be looked for from the contribution of subscriptions of £100 time after time to "influential" gentlemen making promiscuous trips to Russia and elsewhere to interview Consuls and other officials over the space of a few months, if the matter is left at that nebulous stage. It is likely to prove a more fruitful plan for two or three firms to appoint between them a representative for, say, Russia, to devote his entire services to their interests. If he is kept in touch with by regular weekly or fortnightly correspondence, supported with attractive catalogues and advertising literature printed in the language and currency of the country, and if his suggestions and needs are sympathetically anticipated by the Sales Promotion Department, there should be few, if any, failures provided the commodity he is offering is as good as it is pronounced to be.

In the shipping section, also, another promising future will present itself to British manufacturers after the war. It is well known among travellers and others that the average shipping house has so great a variety of goods to buy and sell that it is often a difficult matter to interest the buyers in any one particular commodity. This, apparently, can only be effected by anticipating, as far as possible, the difficulties of the buyers themselves, by studying individual requirements, printing special catalogues and literature in the required language and currency, and by ascertaining precisely in what form samples are required. Many successful manufacturers who have specialised in the shipping section are not content merely to interest the shipping house buyers in their propositions, but, if possible, to stimulate their enthusiasm as well. This result, of course, can only be attained by judicious and sustained attention, but the rewards, which quickly become permanent in effect, are worth the expense.

On the question of extended foreign credit, and upon credit risks in general, the Sales Promotion Department, by virtue of being constantly in touch with the source itself, should be best qualified to pronounce judgment.

Most large firms already possess the nucleus of a Sales Promotion Department, and such firms are devoting every attention to enlarging the scope of this important section. Other firms will doubtless follow their example immediately peace dawns. Nothing, however, can be lost by preparing the foundations now. Probably most large firms would find it possible and desirable to single out enterprising members of their staffs capable of organising and conducting this department, for a thorough inside knowledge of the trade is essential to success.

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**Our Trade with South Africa.**

A study of the recent report by H.M. Trade Commissioner in South Africa (Mr. W. G. Wickham), a summary of which appears on another page, will afford British manufacturers some instructive information regarding future possibilities in that market. The important factors operating in this direction are (1) the progress of manufacturing within the Union; (2) its effect in creating a demand in the immediate future for industrial plant and accessory material; (3) its ultimate effect in restricting the importation of goods which can be produced locally. As regards (1) and (2), bearing in mind various details which have already appeared in these columns, exporters here, after studying Mr. Wickham's report, will be able to make useful deductions as to the types of machines and appliances which will first be needed. As regards the potential future demand for British manufactured goods generally, there appears to be no cause for alarm. If the Union is entering an era of manufacturing as well as agricultural development, increased purchasing power will obviously go with it, and there will be plenty of scope for the sale of imported goods. For a prospering community to demand goods from abroad of a better quality or of a different and more expensive type than are being produced at their own doors, is in these days a sure accompaniment to advancing civilisation. But although the business is there to be got, unless our exporters put forth real and persistent efforts they must not expect to get it. American and Japanese competitors are in the field accumulating knowledge of the market and laying their plans for future trade. We, too, must lay our plans for rapid and decisive action after the war. Mr. Wickham says:—"We shall have leeway to make up, and, in many cases, shall find that we have got to give very complete proof of superior value before we can get back our full share of the business. . . . Firms must improve and strengthen their selling organisation."

The concluding paragraph of our summary should receive attention. If our manufacturers would make greater use of Trade Commissioners, they would, we are sure, find it to their advantage. The more our Commissioners find that we rely upon them, the more zealous they will be in rendering us just that service that they know we are asking at their hands.

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**Commercial Bribery.**

Our attention has been called to particulars issued by the Bribery and Secret Commissions Prevention League with regard to legislation now being put forward in the United States. It seems that the Federal State Commission has recently submitted a special report to Congress on the subject, in which it is stated that bribery of employés is a prevalent and common practice in many industries. These bribes take the form, for alleged services, of gratuities and entertainments of various sorts, and of loans, all intended to influence such employés in the choice of materials.

The growth of the evil is remarked upon; and to show that in some cases employés appear to be quite unaware that the practice is criminal, the Commission quotes the case of a buyer who said to a prospective seller that he was "entitled to 10 per cent., and anyone who demanded more was a grafter." Another man in a similar position was so fully convinced of the justice of his claim that he wanted the representative of the Commission to assist him in influencing the collection of a secret commission. It appears that 14 States have statutes striking at this practice, and yet it tends to grow.

The Commission recommends legislation prohibiting not only the giving and offering, but the acceptance and solicitation, of any gift or other consideration by an employé as an inducement or reward for doing any act in relation to his employer's affairs or business, or for showing, or forbearing to show, favour or disfavour to any person in relation to his principal's or employer's affairs or business. The Commission proceeds:—

> In order to prevent a resort to a common method of corruption, it is recommended that the law should also prohibit the giving of any such gifts or other considerations to members of the agent's or employé's family, or to any other person, for his use or benefit, direct or indirect.

The practice appears to have been most general on the part of concerns introducing the goods and wares of German firms. We have commented before on the comparative absence of bribery and corruption amongst municipal and Government officials in Germany before the war. It is a curious fact, illustrating once more the deep-rooted belief of Germans in their own superiority, that many of the firms who were most strict in regard to their practice at home, never hesitated to employ corruption to any extent outside the Fatherland.

The Bill recommended to Congress by the Federal Trade Commission follows very closely the British model, the punishments provided for the giver and receiver of the bribe being, respectively, to the one who gives or offers, a fine of not less than $1,000 or imprisonment for not more than two years, or both together; and to the receiver a fine of not less than $1,000, nor more than $5,000, or imprisonment for not less than two years (apparently it can be any amount more), or both such fine and imprisonment.

We welcome the distinction which is drawn between the giver of the bribe, who is, as a rule, merely endeavouring to carry out his duty of obtaining trade for his employer (albeit by nefarious methods), and the receiver, who is betraying his trust. It will be remembered that when our own Act was passed we laid stress on this distinction, without, however, being able to obtain any modification of the Law. The most important advance, however, in our opinion, is Sec. 4, which provides that any person guilty of an offence within the provisions of the Act, who reports the facts under oath to the proper official within six months

after committing such offence, may be granted full immunity from prosecution provided that such information shall not then be in the knowledge of such official. In other words, the party who first confesses can get his confederate locked up while escaping "Scot free" himself. We welcome this excellent provision, which should help to bring to light transactions which are generally only too well and too long concealed, and we have little doubt that it will have a good effect, in view of the fact that men mixed up in such transactions almost invariably quarrel sooner or later.

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**"Somehow or Other."**

Events are moving with such startling rapidity in Europe that it is dangerous to speculate concerning the time when we may be called upon to transform to actual practice some of our pious resolutions of the last few years. It may happen that the emergency will be upon us speedily—we trust that such will be the case. Much has been proposed in preparation for that day. The circumstances are such, however, that we have not to fear immediately the difficulties attendant upon the demobilisation of the fighting forces. That cannot be expected to commence on a large scale for some time to come. It has been in progress for a long while gradually; the pace will increase as the situation develops satisfactorily, but it will still be gradual, and will be systematically effected. The ability of trades to absorb men is to be considered by local Advisory Committees, with the intention to avoid the flooding of the country with unemployed labour. Plans made in advance will be adhered to as far as practicable—experience is certain to compel some variations. The Government has made certain arrangements for the occupation of the waiting Forces with education and training for trade, profession and citizenship. The eagerness to return home that will possess millions of fighting men is understood at Westminster, and probably by "leave," and in various other ways, the irksomeness of the lot of the men will be lessened. The undertaking will be a vast one, and anything that can be done to secure smooth working the nation will be eager to vouchsafe. We have not passed along this way before in all our history, and notwithstanding all the demobilisation experience of the last few years, new difficulties are bound to arise which will call for the exercise of great patience and sympathetic handling.

The problem of the munition workers is of another character altogether. When the situation is so safe as to permit of it, their war-time occupation will end. It has been stated that a period of holiday, rest, recreation, or rejoicing will be given to all. During that period it should be possible for a good deal to be done by way of carrying into effect the plans already made for turning works over from one class of manufacturing to another where necessary. It will be probably at this stage, when the first steps are taken to return to actual Peace-time production, that certain of our industrial problems will experience their first acute period. Without anticipating those problems in the mass, it is essential that we bear constantly in mind one of the leading matters that will require full and considerate attention. It has been brought under public notice in one or two recent speeches; that is why we refer to it now.

At successive crises of the war the Government has negotiated with Labour in order to secure variations in working arrangements facilitating increased productivity, and involving all sorts of changes affecting different classes of workers in many trades. Understandings have been arrived at under which Trade Union conditions, limiting restrictions, and so forth, have been departed from, and undertakings have been solemnly given to restore pre-war conditions at the end of the war. The promise holds good; the intention to keep faith is unaltered. But is fulfilment possible? If it were possible would it be wise? Does Labour desire it? Would not its fulfilment most adversely affect the interests of Labour as a class, as well as the prosperity of the Empire as a whole?

Let us briefly allude to the utterances of two of the highest official representatives of Labour—Messrs. G. H. Roberts and G. N. Barnes. The former, as we reported last week, states that a Bill is shortly to come before Parliament which will ensure the carrying-out of the Government's undertaking. We have no material available to show whether he added qualifications or gave particulars of the details contained in the Bill. But Mr. Barnes we have heard for ourselves, and while we find him agreeing that the conditions should be restored "as far as it is possible to do it," he adds, "if the Government is kept to its bonds," and proceeds to show that in certain respects it will be impossible to return to the old conditions. It is well that this statement should come from such a source; were it otherwise, some Trade Unionists might fear that they were to be robbed of their rights by Capital. The changes effected in industry during the past four years cannot be ignored by any of us. Labour is not likely to make the mistake of ignoring the advances of science and scientific application, the employment of new mechanical and other contrivances, the effect of such devices in rendering unskilled men able to do skilled men's work, the usefulness of woman labour in industry, the general improvement effected in conditions of working in efficient factories, and so forth and so on. The attitude of Mr. Barnes toward all such developments is one of recognition of the fact that since the compact between the Government and Trade Unions was made the situation has so changed that it would be folly to insist on a return to former restrictive ways. But the altered conditions alone cannot dispose of the bargain; therefore, Mr. Barnes, speaking for Labour—we would that he represented a larger section of it—says that those who "give up" must have a *quid pro quo*. What form is that *quid pro quo* to take? As we have said several times lately, utterances on this point are far too vague; but last week Mr. Barnes got a little nearer to definite proposals. How those proposals are to be carried into effect is not quite so definite, for repeatedly in the course of his speech he used the expression, "somehow or other." Three requisites form that *quid pro quo*. First, the eight-hour day, for which Mr. Barnes, Mr. Burns (now shadow of his former self), and the A.S.E., fought unsuccessfully in the different conditions of 1897. One of the ways of introducing this change would be to get rid of the always wasteful pre-breakfast attendance; this idea has been favoured by many engineers for years past, and in our opinion is one of the sanest of the practical propositions that have been put forward for introducing the better conditions of life that Labour demands. Secondly, Mr. Barnes suggests the fixing of standard rates of wages. "Somehow or other," not without much difficulty, this may be secured. Lastly, and here a very justifiable "somehow or other" may be repeated, there must be security for continuity of employment. We have to safeguard our industries, and run them in the interests of the nation and of the Empire; but Mr. Barnes eschews tariffs—at any rate, he will not favour them as a means of wealth production. The wealth which attracts him is the production of "healthy and happy men and women and children." He sees a vast debt of ten thousand millions towering above us. It must be reduced! How? By producing healthy and happy men and women and children? We are sure that Mr. Barnes sees as plainly as any of us that you cannot in the years that are coming have that very desirable state of society unless you have first that material production of wealth which is conducive to health and happiness. You cannot reduce that huge debt at any reasonable rate unless you produce wealth as rapidly as possible. Repudiation of that debt, reduction of the rate of interest, he will have none of. Very definite marks of sanity and of wise leadership these. But if you hold in low esteem the production of material wealth, how will you bring in this contented world? Can we not get any farther than "somehow or other"? The time is far spent, surely.

Probably the speaker's intention was that we should find the way of bringing in the new state of things in the paper that followed from the President of the Board of Trade, in which the investigations of after-war Committees and the developments of war-time were summarised. Of course, there has been a lot of practical reconstruction work in progress as we have prepared efficiently to wage war, but there is much in the recommendations of Committees that is as yet only on paper, and, unfortunately, we still have to rest in respect of such in the vague "somehow or other" of politicians.

## THE PERCENTAGE ERROR.*

By ALEXANDER RUSSELL, D.Sc., M.I.E.E.

In the Electrical Review for September 6th Mr. A. T. Bullen raises the question of the meaning of "percentage error." Everyone who has experience of writing reports on the accuracy of instruments is aware that the percentage error method of stating the accuracy of an instrument has serious limitations. He is also probably aware that different engineers have different methods of defining the "percentage error." Some define it as meaning the error expressed as a percentage of the true instrument reading, whilst others, like Mr. Bullen, define it as a percentage of the actual instrument reading. Some even use both methods. Each has its special advantages and disadvantages. It seems, therefore, very desirable that the question, although an extremely elementary one, should be formally discussed to see whether it is advisable to standardise a definition.

The orthodox academic definition may be given in algebraical symbols as follows:—Let R be the true reading, R′ the observed reading, and $e$ the percentage error. Then, when R′ is less than R, $e$ is defined by the equation—

$$e = 100\,(R - R')/R, \text{ low}, \quad \ldots \quad (1)$$

and when R′ is greater than R, we have—

$$e = 100\,(R' - R)/R, \text{ high}. \quad \ldots \quad (2)$$

$R - R'$ or $R' - R$ is called the "error," and $(R - R')/R$ or $(R' - R)/R$ is called the "fractional error." In theoretical calculations it is customary to consider the fractional error and not the percentage error. Engineers, however, have a strong predilection in favour of percentages. For instance, in the definition of the slip of an induction motor given in many books it is defined as a percentage!

It is obvious that whether R′ is less or greater than R, $e$ is simply directly proportional to the error and inversely proportional to the reading. Hence, if we double the true reading, the permissible error for a given $e$ is also doubled. If the instrument is reading low, we see by (1) that R′ can have any value between 0 and R and $e$ has any value between 100 and 0. On the other hand, if the instrument is reading high, R′ can have any value greater than R, and thus $e$ has any value between 0 and infinity. An instrument, for instance, can have an error which is 500 per cent. high, but it cannot have an error greater than 100 per cent. low. Possible errors in excess range from zero to infinity, but in defect they must be between 0 and 100. We see, therefore, that different scales are used for measuring errors in excess and defect. It is not surprising that the percentage error method of stating accuracy is found difficult of comprehension by the uninitiated. An ordinary user of electric light studying an official report in which it is stated that his meter is 80 per cent. slow is not easily convinced that his meter bill has to be multiplied by 5. It is easier to convince him that if his meter be reading 270 per cent. fast the meter reading should be divided by 3·7. We have heard of one case where the consumer thought that the meter reading should be divided by 270 and not by 3·7.

A drawback to the percentage method of expressing errors is that we are given in practice the observed reading, and we want to find the true reading. In this case we have to solve equations (1) and (2). If the reading is low, we get—

$$R = R'/(1 - e/100), \quad \ldots \quad \ldots \quad (3)$$

and if high

$$R = R'/(1 + e/100). \quad \ldots \quad \ldots \quad (4)$$

We see at once that when $e$ is 80, the reading being low, $R = 5R'$, and when $e$ is 80, the reading being high, we have $R/(1{\cdot}8)$.

To illustrate that the method is misleading, let us consider the case of an assistant A, who tells you that the length is one foot when it really is one inch. The percentage error is 1,100, and the inaccuracy seems hopeless. But if an assistant B tells you that the length is one inch, while it really is one foot, the percentage error is about 92 per cent., which, although grossly inaccurate, does not strike one as being so terrible as A's mistake, because the percentage error is only one-twelfth that of A. Yet common-sense tells us that the error of B is really as bad as that of A. As another example, let us consider the case of a watch, the rate of which is treble the true rate, and of another watch, the rate of which is only one-thousandth of the true rate. The percentage error in the first case is 200 fast, and in the second case it is less than 100 slow. Even if the latter watch stopped, its error would only be 100 per cent. slow.

To make the definitions of percentage error given above rational, we have to introduce the limitation that $e$ is a small number. For instance, if we never give percentage errors greater than 5, then not much harm is done, and the number can be taken as a rough index of the accuracy of the instrument. It has to be remembered that when the percentage error is a large number, it has a different meaning when in excess than when in defect, and, therefore, ought not to be used.

Let us now consider the other definition of percentage error, the definition which Mr. Bullen wants to be the standard when testing electric meters. Using the same notation as before, and calling $e'$ the "percentage error," we have

$$e' = 100\,(R - R')/R', \text{ low} \ldots \quad \ldots \quad (5)$$

and

$$e' = 100\,(R' - R)/R', \text{ high} \ldots \quad \ldots \quad (6)$$

The great merit of this definition is that we can find the error at once when we know the reading by simply multiplying the percentage error by the reading, and dividing by 100, and then, by adding or subtracting the error from the reading, we get the true reading. In symbols we have, when the reading is low,

$$R = R'\,(1 + e'/100) \quad \ldots \quad \ldots \quad (7)$$

and when high

$$R = R'\,(1 - e'/100) \quad \ldots \quad \ldots \quad (8)$$

It is easy to see that when the reading is low the percentage error lies in value between zero and infinity, and when it is high it lies in value between 0 and 100. The scales of error for high and low readings are thus reversed from what they were in the preceding case. In this case the meters which read low have the huge percentage errors, and however fast they run, the error can never be greater than 100 per cent.

When $e'$ is small we see by the Binomial theorem that it is practically equal to $e$. Even if we took $e'$ as great as 5 the maximum error introduced by using (5) and (6), instead of (1) and (2), would be less than three in a thousand. Thus, there can be little objection to using (5) and (6) when $e'$ is small. But if $e'$ is large we get quite irrational results. The following table illustrates the relative values of $e$ and $e'$:—

*True reading* = 100.

| Low observed reading. | $e$ | $e'$ | High observed reading. | $e$ | $e'$ |
|---|---|---|---|---|---|
| 100 | 0 | 0 | 100 | 0 | 0 |
| 80 | 20 | 25 | 120 | 20 | 16·7 |
| 60 | 40 | 66·7 | 140 | 40 | 28·6 |
| 40 | 60 | 150 | 160 | 60 | 37·5 |
| 20 | 80 | 400 | 180 | 80 | 44·4 |
| 0 | 100 | Infinity. | 200 | 100 | 50·0 |

If the observed reading were 1,000, $e$ would be 900 and $e'$ would be 90, and if it were 10,000, $e$ would be 9,900 and $e'$ would be 99.

From the common-sense point of view for low readings, $e$ as defined by (1) seems to be the best, and for high readings $e'$ as defined by (6). If we were to adopt these formulæ as the standard definitions of percentages, and, of course, we are quite at liberty to do so, as there is nothing sacrosanct about engineering usage, then a meter which had stopped would be said to have a percentage error of 100 slow, and one which went at three times its proper rate a percentage error of 66·7 fast. The comparison in this case seems to be as rational as it is possible to make the percentage method on the assumption that errors in defect are as objectionable as errors in excess.

We are of opinion that in most cases it is best not to give percentage errors at all. In the case of meters, for instance,

* *Faraday House Journal*, Michaelmas Term, 1918.

surely it is sufficient to measure the ratio $n$ of the true rate to the actual rate. If we do this—

The true rate = $n$ times the actual rate.
The true reading = $n$ times the observed reading, and
The true bill = $n$ times the apparent bill.

Anyhow, this method has the merit of being plainly intelligible to the ordinary consumer, and will obviate the necessity of the worry and consequent friction which is sure to arise when he is told that his meter is 87·5 per cent. slow. Within very small limits the percentage method is good; outside these limits it is misleading.

## THE BENJAMIN ELECTRIC'S WORKS.

In its factory in Rosebery Avenue the Benjamin Electric, Ltd., was seriously handicapped by the increasing pressure on its space, although every foot was utilised, including part of the roof. Consequently, when the opportunity presented itself to purchase a ready-built works in the north of London precisely adapted to its requirements, the company gladly seized it, and has now settled down in its new quarters. The buildings, which are practically new, cover an area of over 20,000 sq. ft., and space is available for extensions of 30,000 sq. ft. The shops and offices are of modern design and are all on one floor, with north lighting, thus presenting a marked contrast with the old factory; the lay-out facilitates efficient supervision, and allows of the organisation of the work to the best advantage, the shops being arranged on such a plan

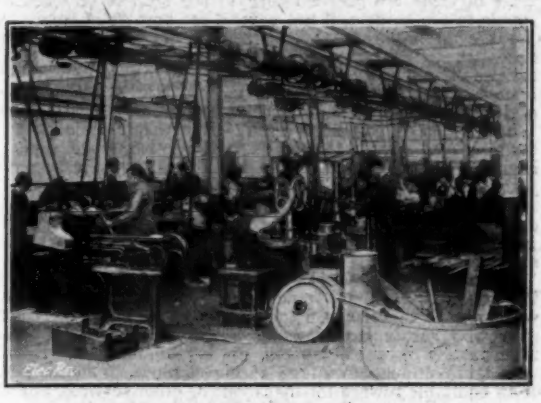

Fig. 1.—Benjamin Electric: Machine Shop.

that the manufacturing processes follow one another in regular order from the raw material stores, through the various departments to the finished goods stores. Thus it is possible to trace the progress of any job from start to finish, with the greatest economy of time both in production and in supervision. Under present conditions, time saving is of the utmost importance to efficient production, and has received the closest attention on the part of the management; even in the short time that the new factory has been in operation the gratifying results which have been obtained, as shown by the increased rate of production, have borne witness to the wisdom of this policy.

We recently had the privilege of making a tour of the shops and observing the vast improvement in the manufacturing facilities which they afford. As the factory was formerly devoted entirely to manual work, there was no shafting in position, and therefore the company was able, in erecting the necessary equipment, to select the most suitable arrangement for the lines of lathes, presses, &c., which are all driven by electric power. The products of the works include the well-known Benjamin reflectors, Goliath lampholders, &c., and a variety of special work of national importance. We have on previous occasions referred to the remarkable spinnings of which the company has made a speciality, but all former efforts have been far surpassed by its latest achievements in this line; the accompanying views show some of the extraordinary products of the spinning department. Press work is also an important feature of the company's operations, and for this purpose there is a range of seven power presses, varying in size from the large deep-drawing machine for the heavier class of work to the small presses on which such parts as holder cases, reflector extensions, small electrical parts, &c., are stamped. In the tin shop a large variety of high-class hand work is turned out; the machine shop is almost entirely engaged in making the tools necessary for successful production; and in the assembly shop the various parts are brought together, after which, if necessary, they pass to the enamelling department.

A comfortable canteen, with accommodation for 150 persons, has been provided for the workers' mid-day meal and the break which is made for refreshment during the morning and afternoon spells; and the interests of the employés have been further studied by the division of the spare ground into allotments, on which already there is an abundance of produce.

Fig. 2.—Spinning Shop.

The factory was formerly lighted with high-pressure gas, but naturally the Benjamin Electric, Ltd., as experts in illuminating engineering and industrial lighting, could not rest content with this, and the company is carrying out a model installation that will be in keeping with its reputation. We trust that its future progress, under the able direction of Mr. Guy Campbell, will be such that it will not be long before every foot of the spare ground is required for necessary extensions.

## CORRESPONDENCE.

*Letters received by us after* 5 P.M. ON TUESDAY *cannot appear until the following week. Correspondents should forward their communications at the earliest possible moment. No letter can be published unless we have the writer's name and address in our possession.*

### Patent Law Reform.

"We ought to have the same patent laws as America. We ought also to have an Empire patent. With all the overseas representatives here, this could easily be arranged."—*Vide* Sir Robert Hadfield, Bart., in morning Press, September 26th, 1918.

Returning once more to this subject, might I ask your support in impressing upon the deputation which is to wait on the President of the Board of Trade almost directly, to make the above suggestions its principal text, when there is a possibility of some practical good being accomplished? In addition, a comprehensive and sound report by the Institution of Electrical Engineers has been accepted by the conferences which have been held as forming the basis for the criticism of the proposed two new Bills coming before Parliament.

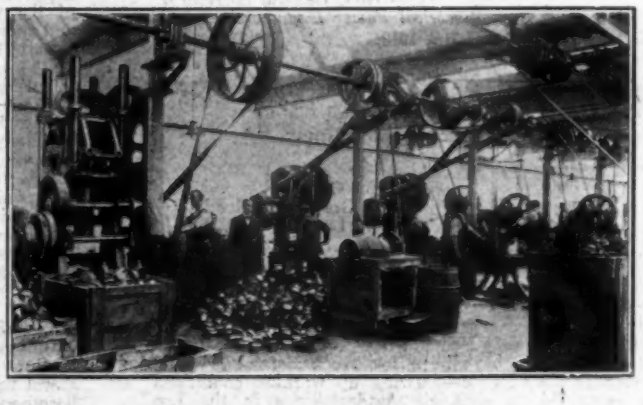

Fig. 3.—Press Shop.

The report justly points out by inference that patents are granted to reward inventors, and that they should not be subject to conditions which simply amount to the legislation of robbery.

The requirement of compulsory working is, of course, not a modern requirement at all. I believe it is found in Letters Patent granted in the reign of Charles I, if not earlier. The philosophy of the subject is at least as old as the French Revolution, but surely

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by this time we ought to have got a long way from that? The whole doctrine is, however, in my opinion, based on a fallacy. It is enough to point out that when the Act of 1907 was passed, Mr. Lloyd George and others exulted over the circumstance that Germans were going to be compelled to put up factories in Great Britain. In actual fact, the Act did not have anything like the effect that it was alleged to have. The point is, however, that in so far as the Act may have led to the establishment of factories by Germans in this country, it simply led to the introduction of a number of very highly undesirable people. It will probably take us a long time to eliminate the undesirable element for which we have to thank the Act of 1907. Do we want to compel the Germans to come over here?

If we do, then let us have compulsory working, or, for that matter, compulsory immigration. If we do not want them, then for Heaven's sake don't let us invite them, as most certainly those compulsory working clauses in the proposed new Bills do. As regards the present obnoxious renewal fees, these ought, in any case, to be materially reduced; but, beyond all that, there is no provision in the proposed new Patent Bill for the establishment of an official search through prior literature *other than British patent specifications*, which, of course, after all, makes any so-called official search a mere farce.

What is the matter with the American patent system? Under it these objections are eliminated, there are no renewal fees, no compulsory working, but no patent is granted unless it can stand a world's search; in comparison, the existing American system *has stood the test of nearly a century, has encouraged invention*, and *has been eminently successful*, and possibly its only objection is that *it is anything but German!*

In the same period of time we in Britain have had numerous Patent Acts, mostly on German lines, and not one of these has been worth a cent so far as the encouragement of invention and progress is concerned, as the report of the Electrical Institution for the guidance of the deputation and the Board of Trade clearly shows.

I, therefore, continue to be in full agreement with Sir Robert Hadfield in advocating the adoption of similar patent laws to those of the United States under a democratic British Empire patent system, and in abjuring anything approaching German lines of procedure.

**James Keith.**

Leigh-on-Sea, *October 3rd*, 1918.

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### "Fraternity"—or Tyranny?

I shall be obliged if you will allow me the hospitality of your columns to draw the attention of all technical staff engineers engaged in the electricity supply industry, or in the generation, transmission, distribution, or utilisation of electrical energy in private plants, to the enclosed letter.

To safeguard their own interests, I suggest that these engineers should support the E.P.E.A., and should write out, sign, and send to me, the following memorial, whether they are members of the E.P.E.A. or not:—

"I, the undersigned, holding the position of in the desire to register a protest against the outrageous attitude of the Electrical Trades Union as evidenced by a letter of the London District Secretary of the E.T.U., dated October 2nd, 1918, and their claim to represent the interests of the executive and supervisory officers of the electricity supply industry.

"It is my emphatic desire that any matters affecting the interests of technical staff engineers in the industry should be negotiated with the Government and all other authorities by the Electrical Power Engineers' Association."

**W. Arthur Jones,**
*Hon. General Secretary,*
*Electrical Power Engineers' Association.*

Leytonstone, *October 7th*, 1918.

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[COPY.]

ELECTRICAL TRADES UNION.

London District Committee.

District Office,
76, Gray's Inn Road,
London, E.C. 1.
*October 2nd*, 1918.

To MR. ——,

Dear Sir and Bro.,—It has been brought to my notice that you intend running out of the Electrical Trades Union and joining this bogus organisation, the E.P.E.A.

Before you do this I should like to draw your attention to the position. We have been for a considerable period—and at considerable expense—drawing up working conditions for men employed in electricity undertakings in the London area. You, in addition to every other man in the industry, will materially benefit through our efforts.

Altogether, apart from this, you have up till now benefited to the extent of 23s. 6d., plus 12½ per cent. on all wages earned, got simply through the efforts of the Electrical Trades Union, and if you run out of the Electrical Trades Union, then you will go out of the electrical industry as far as London is concerned.

We are going to make it absolutely impossible for any man who is a member of this bogus trade union (the E.P.E.A.) to get a living in our industry in the London district.

Sincerely trust, therefore, that you will reconsider your position.

Yours fraternally,
(Signed) W. J. WEBB,
*London District Secretary.*
pp. I.F.W.

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### The Greatest Industrial Problem.

The leading article in the issue of the ELECTRICAL REVIEW of September 27th bore the title of "The Greatest Industrial Problem," and rightly so, for it dealt with a question lying at the root of the very existence of our national industry, namely, the question of the stabilisation of the relations between employer and employed.

The writer of the article lamented that "the mountain of deliberative effort" had so far "brought forth only a mouse," and concluded his wail with the words: ". . . we have never hesitated to give the strongest possible approval to the Whitley principles, but these alone will not suffice to quench the fires that we fear may burst out *if something does not happen to change the spirit* of many workers, and curb the spirit of recalcitrant minorities who delight in strife." (The italics are mine.)

It seems to me that in the words I have italicised, the writer has laid his finger upon the "fountain and origin" of the evil, but he does not suggest what this "something" may, or should, be.

Some seventy-seven years ago—to be accurate on January 25th, 1841—Ralph Waldo Emerson said in a lecture to the Mechanics' Apprentices' Library Association in Boston, "The ways of trade are grown selfish to the borders of theft, and supple to the borders, if not beyond the borders of fraud. . . . We are all implicated, of course, in this charge; it is only necessary to ask a few questions as to the progress of the articles of commerce from the fields where they grow, to our houses, to become aware that we eat and drink and wear perjury and fraud in a hundred commodities." God save us! What language could Emerson select to-day adequately to describe the cynical selfishness, the ignoble greed that has characterised so much of the trading during the past few years; what words could he find adequately to denounce the methods of the profiteering plutocrats who have sprung into existence as a result of the shameless advantage they have taken—no doubt quite *legally*—of the necessities of the nation?

The context of his lecture shows that Emerson had in mind the relations between tradesmen and their customers, but what valid distinction can there be made between the tradesman who cheats his customer by delivering inferior goods intentionally made to appear up to sample, the employer who takes undue advantage of his employé to deprive him of an equitable reward for his labour or other services, and the employé who puts in a different kind of work when his employer's eye is on him to that when his employer's back is turned? Is it not theft pure and simple in either case? And is not theft—academically—an offence against the law of the land, not to speak of that Higher Authority whose teaching we in this country profess to follow?

Injustice and dishonesty between tradesman and customer have come to be glossed over under the euphemism "tricks of the trade," and it is not to be wondered at, in fact it is only natural, that the same principle—or want of principle—should have permeated the relations between employer and employed. I don't suppose the heart of man is more desperately wicked to-day than it was in Emerson's time or that of the prophet Jeremiah, but its opportunities are greater and more frequent, and the consequences of dishonesty more apparent because of the linking up of humanity in all parts of the world by the electric telegraph and other wonders of scientific invention and discovery.

There is probably no fundamental principle in pure ethics to-day that was not known to pagan philosophers. The constructive power of the practice of the golden rule has been recognised from time immemorial, but the hopelessness of making a man honest by Act of Parliament has passed into a proverb. Many people seem to have the same muddle-headed notion respecting the laws of the land that they have about the laws of nature, namely, that somehow or other a law possesses the power of putting itself into action. The law of the land is only effective because of the existence of power behind it to punish infractions thereof, just as the laws of nature owe their existence and continuance to the Directive Power Which ordained them.

But *quis custodiet ipsos custodes?* If those in whom ultimate authority rests are not themselves honest in virtue of moral principle, legislative enactments, however well drafted, become the breeding ground of bribery and corruption. "The possession of special power constitutes the greatest temptation with which virtue can be assailed; in difficult circumstances few men can wield extraordinary power long without positively committing crime." Legislation, committees, boards of control, and the like, are all very well as means to an end, "your dialectic may force a man to *acknowledge* the right action, but where is the dialectic that will force him to *do* it?" It is comparatively easy to convince the average man that he *ought* to act in such and such a way, or to think in such and such a manner, but unless the impelling force

so to do comes from within himself, what will your arguments avail if self-interest conflict with right? "Nothing is so easy as to be religious on paper," says Newman.

The truth is—and there is no use in blinking it—that most men of balanced mind and experience of the world know perfectly well the root cause of "the greatest industrial problem" and equally well realise the only possible solution. The cause is primarily the absence of good faith between employers and the employed, and the remedy is the inculcation of sound, healthy moral principle in the minds of the rising generation. Any measures which may be devised to arrest, or even to delay, the headlong speed at which we are rushing towards social and economic ruin, are to be welcomed so long as it is clearly recognised that such measures are, and can only be, of the nature of palliatives. It is futile to expect habits of mind engendered by generations of growing mutual distrust to be changed in a twinkling even by a super-Whitley. No system of water purification will ever make a stream run clear if it springs from a polluted source. "The higher we build upon an unsound foundation, the greater the danger we run. The more we aggregate the victims of an infectious disease, the more we intensify its evil, and the undisciplined will is an unsound foundation, an infectious disease. Any attempt therefore to improve society which does not begin with the will, and consequently with the individual, is either ignorantly superficial or consciously hypocritical."

**Radix.**

## GOODS TRAFFIC ON TRAMWAYS.

Considerably increased attention has recently been directed in railway circles to the carriage of goods by tramway systems, and the present time is not inopportune to briefly review the subject in some of its principal aspects. The following particulars are abstracted from the September 7th, 14th, and 21st issues of the *Railway News*.

Early in June there was a strenuous railway opposition to the proposed goods carrying powers of the Sheffield Corporation; since then Mr. Bonar Law has announced in the House of Commons, on July 16th, that a Select Committee would be appointed "to review the various agencies by which transport and the delivery of goods are effected in this country," and, finally, there has been the decision of the London County Council, at its meeting on July 30th, to adopt the Highways Committee's recommendation to expend £100 on the conversion of two tramcars for an experiment in the carriage of goods on the Council's tramways. The terms of reference of the Government Committee to which we have referred, and which has now been appointed, are very comprehensive, and fully justify the anticipation that the Committee will see fit to consider the particular subject with which this review deals, in addition to the many other issues which must pass under its notice.

In view of the possibilities of road transport on a much larger scale than heretofore, it is scarcely a matter of surprise that the railway authorities should view with apprehension the extension of the statutory powers now held by many tramway authorities.

In many respects the general law relating to tramways was laid down in the Tramways Act of 1870, but that neither expressly authorises nor prohibits the carriage of parcels or goods upon tramway systems, although certain of its clauses appear to assume that such traffic would in some instances be worked upon tramways. Further, it must be remembered that many lines commonly known as tramways are not tramways in the legal sense of the word, but are light railways authorised under the provisions of the Light Railways Act of 1896; there, again, we find that whatever powers may be considered to have been given or may be inferred from the Act of 1896, the right to carry goods where desired by the promoters of a light railway will be clearly defined in the order sanctioning that particular line. We arrive, then, at the fact that the statutory powers with relation to goods carriage on tramways vary with the particular instances; certain tramway authorities are possessed of powers to carry animals, goods, minerals, and parcels; other tramway authorities have only very limited powers. Equally true is it that in some cases the powers even when granted have been exercised, whilst in other cases they have remained unexercised. We should note in passing that with regard to the carriage of mails by tramway there is a general enactment placing upon tramway authorities the obligation to carry when required by the Postmaster-General so to do; in the case of railways the obligation was, of course, placed upon the railway companies in the very early days of their development, viz., by an Act of 1838, whilst the obligation in respect of tramways, to which we have referred, was placed by the Conveyance of Mails Act, 1893.

*Extent of Goods Traffic.*—It needs only a very slight perusal of the official returns to show that goods and parcel carriage has up till now only developed on a very restricted scale. For information on this point, we may refer to the Board of Trade returns on Tramways and Light Railways and Trackless Trolley Undertakings, published in 1914, and dealing with the year ended March 31st, 1914. The whole of the undertakings of the kingdom yielded a gross receipt of about £16,000,000, and of this sum less than £70,000 was produced from the carriage of mails and parcels, whilst from the carriage of animals, goods, and minerals there was produced a little over £13,000, both these figures being equal to only a small fraction of 1 per cent. of the gross income. Or, to take another analysis of the return, we find that of the total number of undertakings in the United Kingdom barely half earn any receipts from the carriage of mails and parcels, and only about half 1 per cent. earn receipts from the carriage of animals, goods, and minerals. It is interesting to note that in the largest tramway systems of the country goods carriage has been almost entirely undeveloped; if we take the nine tramway systems having a length of 50 miles or over, we find that in the 1914 report not one of these undertakings is cited as deriving any income from the carriage of animals, goods, or minerals, whilst in five cases there is an income derived from mails and parcels, but only in one instance, viz., Bradford, does that income exceed a figure equivalent to 3 per cent. of the gross income of the system to which it refers. These figures relate to the last pre-war year, and they take no cognisance of any particular developments which may have taken place during the war period, such as the traffic at Leeds. The nine tramway undertakings to which we have just referred are those of the London County Council, Corporations of Glasgow, Manchester, Birmingham, Liverpool, Leeds, Bradford, and the Metropolitan Electric and London United Tramways Companies. It would, however, be quite a mistake to suppose that there are not individual cases where parcels and goods carriage have been developed with advantage both to the tramway authority and to the public. Nor would it be right to assume that the absence of receipts from these classes of traffic is in itself any demonstration that the traffic cannot be profitably or conveniently worked, for there are many cases in which the tramway authority has no statutory powers to conduct a goods traffic. To take one instance alone, the London County Council, the largest tramway authority in the kingdom in respect both of mileage and of gross receipts, has only very limited powers in the matter, these being confined to the conveyance of luggage accompanied by passengers, and conferred by the Council's Tramways and Improvement Act of 1911.

At the recent hearing on the Sheffield Bill the Corporation was, naturally, at pains to show the success which had attended the development of goods and parcels traffic at certain places where it had been adopted, and to some of these we may now briefly refer. Huddersfield Corporation, for instance, began to operate its goods carrying powers in 1904, and in the last completed year of working over 13,000 tons of coal were conveyed by the tramway system, in 10-ton wagons from London and North-Western Railway sidings to certain factories in Huddersfield and district; over £1,300 being expended in laying a siding connection whereby the tramway wagons could gain access to the railway company's coal shoots. Again, at Leeds, the Leeds Fireclay Co. made an arrangement with the Corporation in 1915 whereby the company's materials are carried over the tramway lines, and thus conveyed from the company's pits to its works, a distance of five miles. Here, again, it was stated the loads were taken through the city during the hours of early morning and late afternoon without apparently any detriment to the working of the ordinary passenger traffic. Another instance furnished to the committee was that of the Black Country tramways, operating nearly 100 miles of line in the Midlands; in this case old tramcars have been used for the carriage of various goods, the load being something like 5 tons, and, additionally, this company has built a special type of car for goods traffic, taking a load of 10 tons with a 2-ton trailer attached.

*Parcel Traffic.*—This has been developed on the tramway systems much more generally than has goods traffic, the gross income derived from parcel carriage on the undertakings of the kingdom being over five times that derived from goods traffic. The instances in which parcel traffic has been developed are much more numerous than those relating to goods; many of the large Corporation systems conduct a parcel traffic, including Blackburn, Bradford, Burnley, Halifax, Huddersfield, Leeds, Manchester, and Newcastle-on-Tyne, whilst of the company-owned undertakings the Birmingham and Midlands, the Potteries, and the Spen Valley systems also conduct this class of traffic. The income derived is, in most cases, only a very small fraction of the gross income of the undertakings; judged from this standpoint, Bradford appears to be one of the most successful, but it must, of course, be conceded that in estimating the utility of such a service the convenience afforded to the public by its adoption should be considered no less than the actual income accruing to the tramway authority.

In Manchester an extensive parcel traffic has been developed on the Corporation tramway system since 1907. In that year the total yield therefrom was £1,685, a figure which shortly before the war had risen to one of £13,990 per annum, an increase which certainly affords striking evidence that, at all events in regard to parcel traffic, the tramway can prove a very useful medium of transport. So much impressed was the Manchester Corporation with the possibilities of municipal parcel carriage that some twelve years ago it announced its intention of starting a parcel delivery service not confined to parcels or goods actually carried on the tramways; here the Corporation came into conflict with the principal carriers serving the city, for Messrs. Sutton brought an action against

the Corporation, and secured an injunction from Mr. Justice Farwell restraining it from conducting a parcel carriage business except as part of the tramway undertaking. Again, when in 1914 the Corporation sought further Parliamentary powers in regard to the running of omnibuses, it also secured the power to convey parcels by such omnibuses, subject to a weight limitation not exceeding 56 lb. Bradford and Huddersfield have also developed parcel services. On the Bradford Corporation tramways during 1916 over 800,000 parcels were dealt with, yielding a gross income of over £11,000, which during the following year had increased to £13,000.

*Carriage of Mails.*—The carriage of mails, as we have already stated, was made obligatory on tramway authorities, in cases where the postal authorities so desired, and in this connection we should mention an interesting development at Huddersfield, where some years ago the Corporation affixed letter boxes to its tramcars, thus providing a frequent collection of letters from the outlying districts into the chief post office.

*Obstacles to Extension of Goods Traffic.*—There are, of course, obvious difficulties in the way of any extensive development of tramways for goods carriage. Any system to be practicable would, it appears, entail considerable capital expenditure, in the construction of depôts and of tramway sidings into works or factories, or perhaps into railway goods yards for conveniently loading or unloading the traffic, and in many cases physical difficulties may be presented thereby. Neighbouring towns wishing to have a through system of traffic must, of course, be possessed of the necessary statutory powers to work such traffic, and in many cases fresh Parliamentary powers would be necessary to confer on neighbouring authorities the right, and to authorise the linking up of one system with another. Then additionally to these matters, there is the question of gauge; uniformity of gauge is obviously desirable between systems which are to effect an interchange of traffic, but at present there is nothing like uniformity in this matter. Through running was put into operation, for instance, between Leeds and Bradford, although the Leeds gauge was 4 ft. 8½ in., and the Bradford gauge 4 ft., and in this case variable gauge tracks were used, and the same cars run over the tracks of both systems, practically no difficulty being experienced. For through running, however, uniformity of gauge is an advantage which obviously presents itself. Of the nine large systems we enumerated in a previous paragraph, five have a gauge of 4 ft. 8½ in., two have a gauge of 4 ft. 7½ in., one has a gauge of 4 ft., and one has a gauge of 3 ft. 6 in. In the United Kingdom there are, in fact, six gauges in operation, varying from 3 ft. to 5 ft. 3 in. Only a little over half of the tramway undertakings have adopted the 4 ft. 8½ in. gauge.

*Tramways as Auxiliaries to Railways.*—The question of gauge opens up another very important issue of this subject, and that is the extent to which arrangements might be made for utilising tramway systems as auxiliaries to the railways by running railway wagons from the railway goods sidings on to the tramway and thence into tramway distributing depôts or by means of sidings off the tramway into the works or establishments for which the goods are destined. Obviously a large capital expenditure would be entailed by the making of junctions between the railway and the tramway tracks, and by the remodelling and alteration of railway goods depôts which would be necessitated by the institution of such a scheme, and, needless to say, the making of these junctions could only be effected under Parliamentary powers or upon agreement between the railway and the tramway authorities. Moreover, one of the principal difficulties to be overcome would be that concerned with the question of gauge; for whilst a large number of tramways have been laid to the standard railway gauge, that does not of necessity mean that they are suitable for use by railway rolling stock.

The view has been expressed by some that there is something fantastic and altogether unworkable in the suggestion of a through traffic of railway stock over tramway systems. The history of the subject would scarcely confirm this opinion, for the possibility of such a development was anticipated even as far back as 1870 when the Tramways Act was passed. We find therein the stipulation that in every special Act authorising a tramway the gauge of such tramway should be prescribed, and in the event of no gauge being specified it shall be such "as will admit of the use upon such tramways of carriages constructed for use upon railways of a gauge of 4 ft. 8½ in."; moreover, tramway authorities have recognised the possibilities of the development of railway wagon traffic on their systems, not apparently always with favour, for we find the London County Council, for instance, in its Tramways Act of 1911, obtaining a direct prohibition on the point, Section 9 of that Act stating "the tramways shall be of the gauge of 4 ft. 8½ in., but carriages and trucks adapted for use upon railways shall not be run upon the tramways."

*Rates for Goods.*—If it could be demonstrated that the trader would secure a reduction in goods carriage rates as a result of the institution of road carriage instead of rail carriage, obviously he would avail himself of such advantage. The advantage has still to be demonstrated, at all events, in regard to long-distance conveyance. But it is conceivable that the question of actual carriage cost in some cases might be outweighed by the convenience to the trader of loading or unloading in his own premises, and, incidentally, saving the cost of delivery to or from the railway goods depôt. In the recent Sheffield case evidence was given to the effect that the Corporation's proposed goods rates could not compete with the rates charged by the local carriers; several instances were detailed, in which according to the evidence offered, the tramway carriage rate would work out a good deal higher than the carrier's rate. The rates for carriage, as set out in the Sheffield Bill, are: For coal, 2d. per ton per mile; for iron, ironstone, &c., 2½d.; for grain, timber, light iron castings, &c., 3d.; for cotton, wools, manufactured goods, &c., 4d.; for iron boilers or machinery (from 4 to 8 tons weight), 2s.; and for parcels (from 7 to 56 lb. weight), an increasing scale of 3d. to 9d. for any distance. And, in addition to these rates, the Corporation would be entitled to demand reasonable charges for loading and unloading goods.

*Interurban Traffic.*—With regard to parcel carriage and small goods carriage within the immediate boundaries of a town, railway interests may have little reasonable objection to make, as the traffic is in many cases of a nature not ordinarily dealt with by the railway companies themselves. But with regard to the development of such traffic on longer routes from one town to another, there is, we think, quite reasonable ground for speculation as to whether or not railway interests may be adversely affected by future developments, for it must here be borne in mind that whereas in the early days of tramway development, tramways merely served individual towns and their immediate surroundings or suburbs, they now, additionally to serving such places, have been the means of linking up one town with another, and often providing a service which by its frequency has become a serious competitor to the railway. In the North, Liverpool and Manchester are physically connected by tramway, whilst there is only a short break in the route from Manchester to Leeds now uncovered by tramway line. In the South, a similar development has taken place from London into Kent, there being a connected line of tramway from the Thames bridges as far as Dartford, a distance of little short of 20 miles.

Whilst these developments were taking place a considerable loss of traffic undoubtedly resulted on many suburban services, but such traffic has, to a certain extent, been recovered, in instances familiar to the public, such as the suburban service of South London. However, the spirit of antagonism between the railway and the tramway still exists, and in no small measure, if we are to accept the opinion of the railway company's goods manager, as expressed in his evidence in the recent Sheffield case. In this connection it may be of interest to quote some words used by the late Sir William Preece, when speaking some years ago at a discussion on tramway matters. He referred to the invariable opposition of railway companies to tramway proposals, and proceeded: "In the United States matters had been different. There the managers of the railway companies had seen in the tramways something that could be useful and valuable to them; they had supported the extension of tramways, had invested money in them, and had thus been able to arrange those tramways so that they became feeders to their railway systems," and he added his opinion that in the future "the railway people must look to the tramways as supporters, and not as opponents, of their lines."

## WAR ITEMS.

**Lighting Regulations Infringed.**—Two Stirling women have been fined 10s. each for allowing electricity to be consumed after 10.30 p.m. at a dance in a local hall.

**Municipal Appointments for Disabled Men.**—The Leeds City Council has passed a resolution recognising the special claims of men disabled in the war to employment in the public service, and agreeing that after its former employés' reinstatement claims had been met, preference should be given to such men in filling up vacancies on the Council's clerical, technical, and manual working staffs.

**Mertons' Liquidation.**—According to the daily Press, Messrs. H. R. Merton & Co., Ltd., have passed special resolutions for the voluntary liquidation of the company, and the appointment of Sir Woodburn Kirby as liquidator. The liquidator is authorised to compensate the company's employés for the loss of their employment owing to the liquidation. It is stated that the liquidation will not affect the actions now pending against the Right Hon. W. M. Hughes and the *Daily Mail*, which will be proceeded with.

A meeting of creditors is called for October 22nd at 2, Metal Exchange Buildings, E.C.

**When will the War End?**—The "Times" correspondent at Buenos Aires is privately advised that German firms there have recently received information that the war ends this year, and are warned to act accordingly. "Spain is the channel of communication." The writer refers to the unconcealed satisfaction throughout the Argentine at the turn of events, and the prospects of a speedier termination of the war. He goes on to say that German commerce is harder hit to-day than ever before owing to co-operative Allied measures, supported by friendly neutral firms, who display eagerness to obtain the privileges derivable from a status of recognised friends, and make no difficulties about signing guarantees not to trade with Germans."

**Exports to China.**—Additions to the list of those to whom exports to China may be consigned appear in the *London Gazette* for October 4th.

**U.S. and Reconstruction.**—For some time past there has been little disposition in the United States to consider the problems of reconstruction, the general attitude being in favour of concentration entirely on war preparations. The altered situation in Europe has caused a marked alteration, and senators and others are now devoting a great deal of attention to the subject, and according to the *Times'* Washington correspondent, there is a rapidly crystallising conviction that neither Washington nor the country can afford to be caught napping when peace comes.

**Trading with the Enemy.**—The "London Gazette" for October 4th contains further lists of persons and bodies in the following countries with whom trading is prohibited:—Argentina; Bolivia; Brazil; Chile; Colombia; Cuba; Denmark; Ecuador; Greece; Guatemala; Hayti and Dominican Republics; Honduras; Mexico; Morocco; Netherlands; Netherlands East Indies; Nicaragua; Panama; Persia; Peru; Salvador; Spain, Sweden, and Venezuela.

**Electrical Artificers for the Navy.**—The Admiralty has instituted a new rating, that of Electrical Artificer, with rank as corporal, in the Royal Marine Submarine liners. The prospects for suitable men between 21 and 45 years of age are excellent, the pay is 2s. 6d. per day with 1s. 8d. per day engineering pay, and "all found." While some knowledge of mechanical engineering is an advantage, what is desired is a general knowledge of electrical engineering, particularly with regard to the operation of small isolated plants, comprising direct-current generators, batteries, and switchboards. Candidates should apply to the Department of Naval Recruiting, 20, Cranbourn Street, Leicester Square, London, W.C. 2.

**Postal Workers' Discontent.**—At the meeting of the Postmen's Federation at Derby last Friday, Miss Mabel Bray, delegate from the Postal and Telegraph Clerks' Association, said the Post Office was seething with discontent. It was with very great difficulty they had prevented the women employés taking action. Mr. A. Lynes, a delegate from the same body, said that the proposed amalgamation of the Association with the Federation meant the creation in the Post Office of one of the strongest trade unions in the country. He believed that they might approach the miners, railwaymen, and transport workers and establish a quadruple alliance.

**Reconstruction in the War Areas.**—The "Times" of Wednesday closed an editorial on "The Problems of Housing" as follows:—"The amount of reconstruction to be done in the war areas even before the new fury of destruction started was large enough to absorb all available resources. Now it stretches out to an immeasurable magnitude unless means can be found to stay this most cowardly and spiteful of all German outrages. In any case, the population of the war areas and the occupied countries will have first claim to consideration, nor will anyone dispute it. The initial difficulty is the supply of materials, which will have to be rationed. Then there is labour and finance. The Government's policy of combining the energies of local authorities, utility societies, and private builders seems to us not only the best but the only way of accomplishing the task in hand. But even then patience will be required. The great thing now is to get on with preparations, so that work on a methodical plan may be started at the earliest moment."

**Exemption Applications.**—At Mitcham, an appeal was made by D. B. Jones (33, Grade 3), working partner in a firm making electrical appliances for the Government, and whose partner has been in the Army since 1914. He was given six months.

Barnsley Tribunal has refused exemption, on a proper substitute being found, to B. Gregory (23, Grade 1), electrician, appealed for by Mrs. Burns; and granted three months' temporary exemption to G. P. Deardon (33, Grade 2), electrical engineer, applied for by Mr. E. Broley.

Dartford Rural Tribunal has granted four months' exemption to F. H. Luff (31), electrician, Stone.

At Dewsbury, P. Flanagan (36, Grade 1), electrician's assistant, Westtown, who has buried his wife and three children during the last 20 months, and is left with three other children at home, was given three months' temporary exemption.

## KEY INDUSTRIES.

On Monday last Mr. H. J. Mackinder, M.P., in the absence of Mr. J. Austen Chamberlain, M.P., who was indisposed, opened the New British and "Key" Industries Exhibition, organised by the Industrial Section of the Tariff Reform League, at the Central Hall, Westminster. In a letter from Mr. Chamberlain, which was read, the writer said that the exhibition was one that he would gladly see multiplied throughout the country by any association that had the knowledge and the will to provide so instructive a lesson. It was designed to show in a limited, but carefully chosen field, what we could do to prevent our being again found dependent on foreign and hostile sources of supply for certain articles which are vital to our existence as a nation. Mr. Chamberlain said that his position as chairman of a Government Committee concerned with the securing of supplies showed him that we were at this moment far more dependent upon foreign supplies than he believed any of our countrymen had realised. "We have been living in a fool's paradise, and it is time we awoke to realities." The exhibition showed in a chosen and limited sphere both our past deficiencies and the steps already taken to remedy them, and every thoughtful man interested in the stability of the British Empire and in the development of our industries would welcome it. The exhibition was only a practical illustration of the statement made by Mr. Asquith and Mr. Runciman of our dependence on Germany before the war, and of the necessity for our emancipation. The credit of the Paris resolutions was claimed by Mr. Runciman and for him by Mr. Asquith. "If words have any meaning, Mr. Asquith and Mr. Runciman and the other Liberals who served in Mr. Asquith's Coalition Government are committed to as profound a change in our economic policy as any old Tariff Reformer of us all." If words for them had no meaning, then he, Mr. Chamberlain, admitted that they were free to revert to their pre-war view that dumping was an unmixed blessing, the German monopolist a welcome guest, and dependence on foreign supplies of necessaries a source of strength.

Among those present on the platform with Mr. Mackinder were Sir Joseph Lawrence, who spoke on our patent laws; Sir Thomas Wrightson, and Sir Robert Hadfield. Sir Robert, whose presence was regarded as an illustration of the "non-party," or shall we say "all-party," character of the Tariff Reform League to-day, made some interesting observations regarding our past unwarranted dependence upon Germany, and among other things he mentioned a case from his own early war-time experience. For the purpose of extensive testing operations at Sheffield they employed a certain type of electric lamp for pyrometry. The operations threatened to come to a standstill because those lamps had come from Germany. He, Sir Robert, saw Sir R. Glazebrook at the National Physical Laboratory, who made certain suggestions, with the result that in six weeks we were making the lamp in this country. In the past Germany had done nothing in the scientific and industrial world that we could not have done had we had proper support.

From the observations of Mr. Mackinder it is obvious that the League holds that what are "key" industries for war are equally "key" industries for peace. Science was continually advancing, and we might have a new key industry arising every six months, so that organisation for one industry—say, dyes or magnetos—would not safeguard the interests of other "key" industries. We must not allow any nation to take the keys away from our doors and hold them fast. The exhibition is intended purely for educational purposes; there are no salesmen or agents present seeking "orders." It is limited to some fifteen commodities, and it is desired to tell the British public what was the position before the war, and what has been accomplished since.

In connection with the exhibition, which includes dyes, tungsten, spelter, nickel, manganese, lead, antimony, graphite, magnetos, glass, rubber, electric light carbons, &c., many firms having lent their co-operation. An instructive handbook has been prepared, which it is hoped will be secured by large numbers of readers who may find it impossible to visit the exhibition itself. It can be obtained for one shilling at the offices of the League (7, Victoria Street, London, S.W.).

The exhibition remains open until October 22nd, and is free to all.

## Limitations upon Coal Storage by United States Plants.

—The increasing demand for coal for special war purposes in the eastern part of the country has made it necessary to draw more heavily on the eastern coal fields than was originally contemplated. In order not to disturb the coal supply moving to other parts of the country, it was decided to limit the amount of coal storage that industrial plants would be allowed to accumulate and to carry on hand, and to fix a uniform amount for each State.

The United States Fuel Administrator, according to the *Electrical Review*, U.S.A., has announced the basic policy of the Fuel Administration as to storage as follows:—

"Coal in excess of that required for current operations shall be delivered to plants not on the preference list of the War Industries Board only when it is not in demand for use before April 1st, 1919, by consumers on said list. In carrying out this policy, allowance shall be made for differences in distance from the mines and for differences in transportation conditions which may require more or less storage at the beginning of winter to ensure uninterrupted operation until the following spring."

It is understood that particular cases may require special treatment by a State Fuel Administrator, either by way of granting more stocks of coal than are indicated by the limits, or by restricting them to a less supply.

## TECHNICAL PUBLICITY: A HOMILY.

By T. BIRKETT.

When peace breaks out, there will break out with it an orgy of advertising and publicity schemes, and vast sums of money will be spent. To the watchful eye the signs are unmistakable. The publicity experts and advertising agencies are already commencing their campaigns.

There can be no question that extensive and well-directed advertising will be valuable, even essential, for the development of our new manufactures, and for their proper introduction to new markets; but the ordinary engineer, who is both a buyer and a seller, as well as a manufacturer, and who has views upon the relation of effort to effect, has some reservations in his mind—and small wonder, when he thinks of the past and present advertising of engineering products.

In looking through the publicity matter issued by the electrical industry, as compared with that of the gas industry, one cannot but feel that there is "something rotten in the State of Denmark." The technical Press appears to be full of advertisements which do not advertise; thousands, nay, millions of booklets, post-cards, leaflets, to say nothing of expensive catalogues, are printed and distributed to but little purpose.

In these days there is a lot of talk and ink wasted upon the subject of efficiency, but is there under the sun a single case where the factor of efficiency is so small as in the field of publicity? Even when it is applied to articles of common utility and general consumption it is bad enough, but when it comes to technical publicity it would seem that even this feebleness becomes more feeble still. Anyone with any experience in the electrical trade knows of the existence of large quantities of printed matter which have been dumped upon contractors, central-station engineers, and others, with but little sense of proportion or regard to fitness. The recipients are at first embarrassed by the gift, and then, as the generous hand which sent it shows no signs of exhaustion, they settle down to use it up in any way which commends itself, generally in a manner which would not be so commendable to the donor of the gift. The present high price of waste paper for pulping has probably cleared many shelves.

The case of the advertisements in the trade journal is but little better. These advertisements are frequently so amateurly written, and so poorly displayed and illustrated, that one sometimes wonders whether they are serious attempts to get business, or whether they have any other motive. It is fairly certain, in many cases, that the only readers to be impressed are trade competitors, to whom the reading affords a pleasing and harmless pastime. Seriously, there is something wrong.

The publicity expert will, I am sure, agree. His explanation will be a simple one—that the principals of engineering firms, when they consider publicity at all important, insist upon writing and planning their own advertisements; and when, as is more usual, they do not consider the matter important, they relegate the work to such members of the staff as have nothing better to do. In either case the work is badly done.

The expert naturally thinks that if one is employed who has studied the "psychology of the public" and knows how to write "copy with a punch in it," and who has the services of a "sketch artist" who can devise appealing pictures, each of which "tells a story," one who understands how to make "type talk," who, in fact, knows all the clap-trap of the American publicity agent, then all will be well. Unfortunately for the expert, most engineers have seen those advertisements, and, of the two, prefer the halting statement of the professional engineer who is an amateur advertisement writer, to the more slick appeal of the professional advertisement writer who is an amateur engineer. The average man who reads current commercial literature, and the advertisements and advice therein, acquires a suspicion that the professional publicity expert has gained his knowledge of the "psychology of the public," and the other terms of his trade, from some of the many American books and journals upon advertising. These books, for the most part, treat obvious and trite matters in such a ponderous—not to say Pecksniffian—manner as really to obscure quite simple truths.

There are published, both in England and America, certain journals which are the organs of the professional publicity men. The American journals of this class make most interesting reading, and throw some illumination upon the psychology of the advertising expert himself. At times they are humorous, and the humour is none the less pleasing because it is often unconscious. The pages are well sprinkled with portraits of Napoleonic-looking young men, with an intense look in their eyes, whose many advertising "stunts" are exploited for the edification of their compeers. There are also instructions in the art of advertising and sermonettes to advertising men.

In a recent number there is a special article on advertising for plumbers which could certainly quite easily be adapted to electricians. The article concludes thus:—

> In homes where the living rooms are bright with beauty and rich in comfort, why should the bathroom be obsolescent and unlovely? Why not have it in keeping with all the rest of the home? Then you show the family how beauty and convenience may be united in a sanitary bathroom at reasonable cost. By these policies, modified, of course, as local conditions demand, may the plumber who advertises expand his business. So may he realise that all chance is direction he cannot see; all discord, harmony not understood; all partial evil universal good.

The English and the moral are both a trifle involved, but the intention seems good.

In another number is some account of one Charles Stelzle, who presumably is well known in certain American advertising circles:—

> For a series of years he was prominent as a Presbyterian minister, and he became one of the governing body of the national organisation of that church. He broke away a number of years ago to establish a business in the way of organising and promoting churches and communities. Mr. Stelzle was very much interested in the proposition of promoting churches by advertising at one period of his development, and he then wrote a book that he called "Principles of Successful Church Advertising."
>
> Mr. Stelzle narrowly missed being a great man. He has exhibited elements of greatness in all of his work. While he has always been regarded as an extreme Liberal, his temperament is that of a standpatter.

One is not quite clear either as to the exact meaning of the last word, or as to the attitude of mind of Mr. Stelzle, much less that of the writer of the note; but one gathers a little illumination as to the point of view of American advertisers.

There is another note about a jeweller in Glen Cove, N.Y., who, probably owing to military exigencies, was closing his shop in something of a hurry, but desired, first, to square accounts.

> Moescha Rosenberg advertised in a local paper that he would publish the names of all who owed him money, and did not settle before the next issue of the paper went to press. "I shall publish the name and exact address and vocation of each of the aforementioned deadbeats, giving, in my usual style, a psychological treatise on their character and make-up," was the language of the advertisement. Results came with a rush.

Most of us know many accountants in the electrical industry who wish that the same methods were usual in England; some of us know one or two who could fill the bill.

Extracts from these journals could be multiplied, but one fears they would not give a fair impression. The journals are amusing, but one cannot but feel that they are also a little humiliating to advertisers. Their general tone, from a literary, intellectual, or moral point of view, is much lower than that of other trade and technical journals; and this brings us to the moral of the homily:—What is to become of technical advertising in the near future, when electrical and engineering firms will want all the publicity they can procure?

The general executive engineer, if not dumb, is usually somewhat halting in his speech, and, if the truth must be told, has just a suspicion of contempt for advertising in any shape. The advertising expert is glib enough, but as the "profession" is a new one, he would appear to be just a shade too anxious to justify his claims as a "copy writer" and "display artist" to be quite able to see the fine points of distinction between a general appeal to the public, and a particular appeal to a highly-technical, well-informed, and generally well-educated class which is

conservative, and very shy of ordinary publicity methods. It is a real difficulty. One can see in almost any trade journal advertisements of both classes: the one which is but a badly designed and badly printed trade card, and the other much better designed and displayed, but which, instead of appearing to contain information from one intelligent and capable engineer to another, is more like a performance of one publicity merchant "showing off" for the edification of others in the same line of business. It would appear that both groups have much to forget, and much to learn from each other.

The first thing to be learnt is that engineers must open their minds to the newer ideas in marketing their goods, just as freely as they do to the latest ideas on factory practice. The time of the engineer will be much too valuable in the future, solving executive problems, for him to devote much time to writing advertisements, so that there will always be opportunities for the professional publicity man. For certain of the latter there will be a great field, but the work will demand quite special training. The appeal they are to make will be to men whose general level of intelligence and education is very high, and will tend to become higher.

Much of the newer publicity will take the form of the distribution of the latest information upon technical subjects, from firms who specialise in certain groups of work. There is no reason why certain of this information should not be conveyed through the advertisement columns of trade journals, in short telling words—as, in fact, it now is in some cases. Fuller information will demand circulars, booklets, "house organs," &c.

The quantity of actual printing may be less, but its distribution should be more intensive than dispersive, and the quality much higher, both in matter and manner. The very latest developments of the printer's art and craft must be laid under tribute.

The most ambitious publicity expert will find ample business to be done, provided he can forget most of the things he learned in dealing with the general public. It also might be well for him to remember the aphorism given in the American paper already quoted, that "Smart advertising is not the same thing as good advertising." "Not by a jugful."

## NEW ELECTRICAL DEVICES, FITTINGS, AND PLANT.

*Readers are invited to submit particulars of new or improved devices and apparatus, which will be published if considered of sufficient interest.*

### The "Securitas" Fitting.

We have received from Messrs. Ward & Goldstone, Sampson Works, Salford, Manchester, a pamphlet (No. A 24/5) relating to the "Securitas" attachment for fitting immediately above lamp-

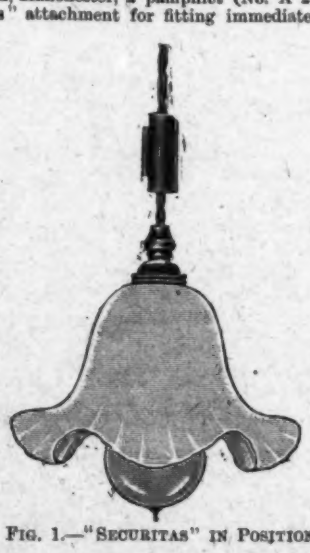

Fig. 1.—"Securitas" in Position.

holder cord grips, for which article we understand the firm has taken over the entire selling rights. It is a well-known device, simple in design and application, and a safeguard against the spread of the area of flame on a flexible cord. The fitment shown (fig. 1) has been adopted by many leading houses, and it is claimed to be equally effective in use as a fire preventer in heating as well as lighting installations. The fitment is asbestos packed. In fixing, the clasp should be thrown well back and the cord firmly placed in the groove before fastening; if the cord is too thick, a little of the lining may be cut out.

### Bradawl and Countersink.

Mr. Leoline Edwards, of 81, St. Margaret's Road, Twickenham, has devised a bradawl which, besides making a hole for a screw,

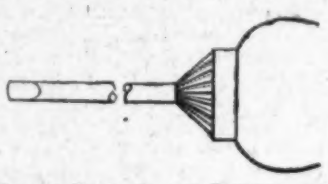

Fig. 2.—Bradawl and Countersink.

prepares the countersink to receive the head of the screw. As will be seen from the figure, it is quite a simple tool, and being a time-saver it is worthy of notice in these days.

## BUSINESS NOTES.

**The Need for a Mark of Origin.**—The Portuguese Chamber of Commerce and Industry in London has taken offices at 20, Budge Row, Cannon Street, E.C., and Mr. Samuel de Lears is hon. secretary. According to the *Times*, Mr. de Lears stated last week that before the war it was a German practice to put many things on the Portuguese market as British goods, simply because the people of that country showed a marked preference for the manufactures of their ancient Ally. Knives were sold with the word "Birmingham" stamped on the blade, when all that was British about them was that the blade was partly manufactured in England. They were sold at cheaper rates than British manufacturers could market the well-made and properly finished article.

**A New Swedish Association.**—According to a Swedish commercial newspaper, a meeting of representatives of the electrical industry has recently formed a new organisation, under the title of the Swedish Electro-Industry Association, whose object is to protect the common interests of the industry in so far as they are not already comprised within the scope of other organisations. The interests concerned are said to be the commercial policy, the establishment of a sound basis for the settlement of business transactions by making arrangements in regard to the granting of credits and conditions of delivery, and the acquisition of rare raw materials on common account. The Association further intends to devote attention to the standardisation of electrical manufactures and the extension of the use of electricity throughout the country.

**Non-Ferrous Metal Industry Act.**—The *London Gazette* for October 8th contains a list of further licences granted under this Act.

**The Problem of Electrical Supplies for Australia.**—According to the *Melbourne Age* of July 18th, an important conference of electrical engineers was begun in Melbourne on July 17th to deal with the problem of ensuring during the next two years a maximum supply of electrical goods from overseas. The delegates were engineers attached to electrical supply undertakings from all over Australia. "It has been shown, by the experience of the Victorian Railway Department, how difficult it is now to secure electrical goods from England and America, owing to the supplying firms being almost exclusively engaged in war work. All the large electrical bodies in Australia are meeting with an ever-increasing demand for power, and this entails the need for increased output and more machinery. The immediate object of the conference is for the representative of each supplying body to compile a schedule of what electrical goods will be needed during the next two years. These needs, it is understood, will be grouped together, and bulk orders will be given to oversea firms, through the Department of Munitions, which will draw the attention of the Munitions Department in London to the needs of Australia. It is anticipated that such grouping and the advice of the Munitions Department in Australia will do a great deal to ensure greater and more adequate supplies. When completed, the result will be reported to the Director of Munitions."

**Liquidations.**—New Vanadium Alloys, Ltd.—This company is winding up voluntarily, with Mr. T. A. Ward, 25, Great Pulteney Street, London, W. 1, as liquidator.

Venner's Electrical Cooking and Heating Appliances, Ltd.—Meeting November 12th, at 85, London Wall, E.C., to hear an account of the winding up.

Union Electric Co., Ltd.—The Controller in this case of winding-up under the Trading with the Enemy Amendment Act (Mr. P. D. Leake) has applied for his release.

**Bankruptcy Proceedings.**—Archibald Maurice Ferguson, electrician, Warrington.—Mr. Registrar Ridgway held a sitting at Warrington, on October 4th, for the public examination of this debtor, whose statement of affairs disclosed gross liabilities of £327 and no assets. In answer to questions by the Official Receiver, the debtor said that, after doing electrical work in his home, he took the shop in Allen Street in August, 1916. He attributed his failure to illness of himself, his wife, and children. He had never kept proper books of account. It was pointed out that the debtor had been on the wrong side since the first day he commenced business. The examination was closed.

**Catalogues and Lists.**—Messrs. E. Bennis & Co., Ltd., 28, Victoria Street, London, S.W. 1.—Twenty-page catalogue containing an illustrated description of truck tipplers for the rapid discharge of railway trucks. The first tippler built in this country for dealing with standard railway trucks was made by Messrs. Bennis for the Metropolitan Electric Supply Co.'s works at Acton Lane, in 1903. After 15 years' active service the tippler is stated to be as good as ever, though many detail improvements have since been made. This plant, also one installed recently to the order of the Government, is described, as are, briefly, Bennis end truck tipplers and ash-lifting plant. Copies of the list will be sent to any reader who applies for it.

Messrs. E.-C. Grammont & A. Grammont, 220, Route d'Heyrieux, Lyons.—Brochure describing various rail bonds, flexible and rigid, trolley wires, &c., together with technical tables and data.

Wardle Engineering Co., Ltd., 196, Deansgate, Manchester.—Illustrated leaflets giving brief particulars and prices of "Inverlite" electric light fittings, ceiling-type fittings for half-watt and one-watt lamps, and external reflector-type for half-watt lamps.

Messrs. Ward & Goldstone, Sampson Works, Salford, Manchester.—Leaflet describing the "Securitas" attachment for fitting immediately above lampholder cord grips. The firm has taken over the entire selling rights for this article.

Mr. W. J. Hobbs, 121, Victoria Street, S.W. 1.—Leaflet describing the standard motor of Messrs. Portable Electric Motors, Limited, which weighs under 10 lb., and gives out 0·3 B.H.P. on A.C. or D.C. circuits.

**Book Notices.**—*Faraday House Journal.* Vol. VIII, No. 1. 1918. London: Faraday House, Southampton Row, W.C.—This is the Michaelmas term number of the *Journal*, and it contains, among others, an article on the Percentage Error, which we reproduce on another page, and one on Irish Peat Utilisation. The Summer Term Examination results are also given, and numerous interesting college notes.

"The Applications of Electrolysis in Chemical Industry." By A. J. Hale. Pp. ix + 146; 58 figs. 1918. London: Longmans, Green & Co. Price 7s. 6d. net.

"The Kearney High-Speed Railway." By E. W. C. Kearney. Reprinted from the *Transactions* of the Society of Engineers. London: The Society.

"The Teaching of Physics in Schools." A discussion at a meeting of the Physical Society of London on June 14th, 1918. London: Fleetway Press, Ltd. Price 1s. net.

## LIGHTING AND POWER NOTES.

**Accrington.**—Wages.—An application for the award granted to the engineering trades on August 10th to be extended to the electricity works' employés, has been referred by the T.C. to the Committee on Production.

**Australia.**—Queensland.—The City Electric Light Co., of Brisbane, is applying to the Minister of Public Works for authority to supply electricity within the shire of Toombul.

With reference to the refusal of the Treasurer to grant an Order empowering the City E.L. Co. to supply electricity to local authorities, it was stated in the Legislative Assembly that the Government considered it inadvisable to grant further Orders to private persons or companies.

The Longreach Council has taken steps to secure a loan of £100,000 for an E.L. installation.—*Tenders.*

New South Wales.—"Some Notes on the Metropolitan Electric Power Supply of the New South Wales Railway Commissioners" was the title of a paper, read on July 5th, by Mr. O. W. Brain, M.I.E.E., before a meeting of the New South Wales Section of the Electrical Association of Australia. Mr. Brain briefly recounted the developments which led to the establishment of the power house at White Bay. The decision to electrify the city railway system made it necessary to build a great generating plant, which, while meeting present needs, should be sufficiently elastic to keep ahead of future demands without tying up capital earlier than necessary. The White Bay power house, when complete, will have cost £1,000,000. The completed power house will burn 1,000 tons of coal per day, which is handled mechanically, while a suction system deals with the ashes. The plant utilises no less than 12,000,000 gallons of water per hour for condensing purposes. This is drawn from a deep level in White Bay, and discharged into Rozelle Bay. The turbine room, when completed, will house turbo-generators of 200,000-H.P. capacity. War and other causes have delayed the completion of the station, and it was not until last May that a full working equipment for ordinary operation was available. The output in KW.-hours in May was 4,928,828, with a maximum hourly load of 15,800.—*Sydney Morning Herald.*

**Barrow-in-Furness.**—Price Increase.—The T.C. has increased the charges for electricity as follows, from the last September meter readings:—Flat rate and demand system, by 10 per cent.; prepayment meters, flat rate, to 4½d. per unit, plus 30 per cent.; prepayment meters, demand system, fixed charges to be advanced by 2d. per week.

**Bradford.**—Mains Extensions.—The E.L. Committee recommends an application for power to borrow £2,809 to cover expenditure on mains extensions; the extension of the mains at Bowling Iron Works, including transformer chamber equipment, at a cost of £1,230, has been authorised.

**Brighton.**—New Plant.—The T.C. has adopted a report of the E.L. Committee recommending that an order be placed for a 4,000-KW. generating set, at a cost of £30,424.

Price Increase.—The Corporation has increased the charges for electricity for lighting to a flat rate of 7d. per unit.

**Continental.**—Germany.—The Railway Administration at Frankfort has erected a power station, using as fuel the "culm" or dust constituted by particles of coal driven from the fire-box into the smoke-box immediately under the funnel. These particles, which are only partially burnt and coked, give a fuel similar to dross coke, and of 3,000 to 4,000 calories. The engine room of the station includes two sets of steam turbines, and generates three-phase current at 6,600 volts. It greatly relieves congestion at the city electricity works. The cost of generating in this way is low, and results in a considerable saving to the railway authorities.

The *Vossische Zeitung* says that owing to lack of coal the municipal electricity works at Cassel have discontinued the supply to factories and other works. Railway traffic in the district has been completely stopped.

Poland.—The Polish Electrical Co. has been organised at Kielce to construct and exploit new and existing electric power stations in towns and districts. Prominent landowners, industrialists, and engineers are the founders.—*Glos Narodu.*

**Falkirk.**—Fuel Wastage.—Speaking at a public meeting last week, Councillor Logan referred to the waste of coal in Falkirk. The Corporation electricity works was unable to supply power for all the manufacturing concerns in the town, and the Coal Board Officer, having taken a census of the coal used for power purposes, found that one-half of the concerns in the town were making their own electricity, and using 15,000 tons of coal per year, while the other half were supplied by the Corporation, which used only 5,500 tons annually.

**Hereford.**—Loan Sanction.—The T.C. has received sanction to a loan of £9,894 for further sums spent in connection with the supply of electricity to a new Government factory.

**Ilford.**—Extensions.—Messrs. Hughes & Sons have applied to the T.C. for the electric supply mains to be extended to their works at Hainault.

**Leeds.**—Loan Sanction.—The Electricity Committee has received the sanction of the L.G.B. to the borrowing of £23,330 for the purchase of a 6,000-KW. turbo-alternator and condensing plant, &c., at the electricity works, on condition that £16,670 (less any sum realised from the sale of the superseded plant) be defrayed out of current revenue.

**London.**—Marylebone.—The Council is seeking power to increase its charges for electricity.

E.L. Charges.—The B. of T. has substituted for the rates prescribed for general electricity supply in the City of London E.L. Order, 1899, the rate of 6d. per unit for one year from October 1st last.

The County of London E.S. Co. has given notice of a further increase in the charges for electricity for lighting purposes of 15 per cent., making 45 per cent. over pre-war charges.

Islington.—Price Increase.—From the commencement of the Christmas quarter the charges for electricity supplied by the B.C. are to be advanced as follows:—Energy sold at 1d. per unit or under, by 50 per cent. (making 100 per cent. on pre-war charges); energy sold at above 1d. per unit, by 16⅔ per cent. (total increase, 50 per cent.); public lighting by ½d. per unit, making the present charge 2½d.

**Manchester.**—Extensions.—At a meeting of the Corporation, last week, it was stated that it might be necessary to start the scheme for the extension of the electricity works at Barton sooner than was intended, and a clause is to be inserted in the Bill, to be promoted next Parliamentary session, for authority for the E.L. Committee to use the water from the Ship Canal at Barton.

**Marsden.**—Proposed E.L.—The U.D.C. has decided to meet a representative of the Electrical Distribution of Yorkshire with regard to the application of the company for a prov. order to supply electricity within its area.

**Newcastle-on-Tyne.**—E.L. Charges.—The B. of T. has informed the Corporation that it is not prepared to reduce the maximum charges which the E.L. companies are allowed to charge. In a report on the matter, the Parliamentary Committee states that no further steps can be taken, and meanwhile instructions have been given for the accounts of the companies to be inspected from time to time by the City Treasurer.

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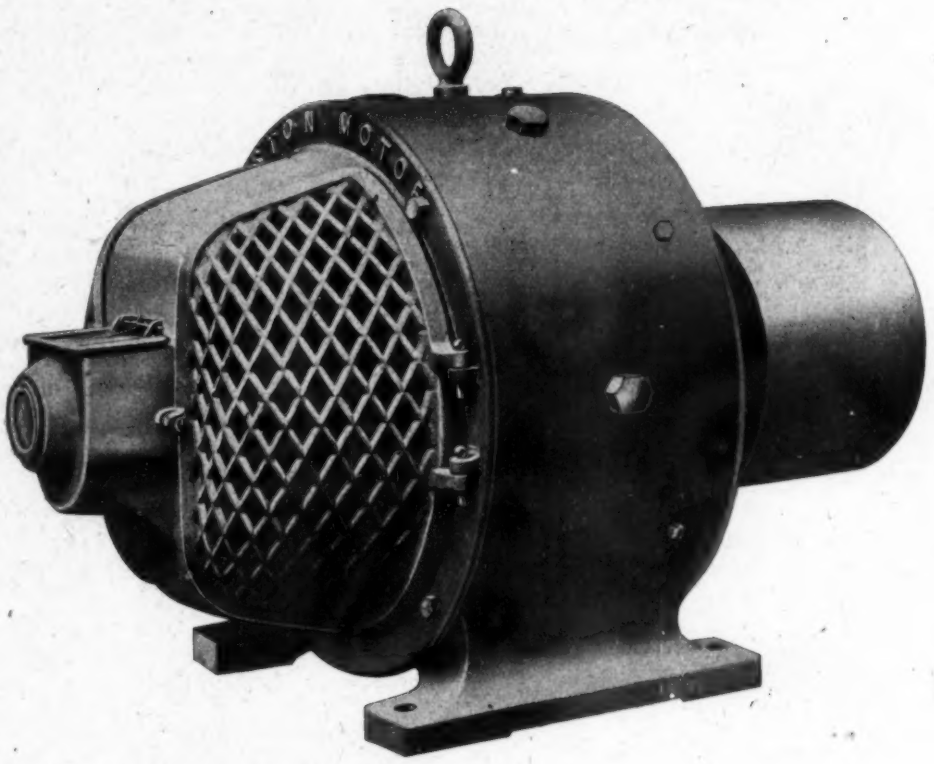

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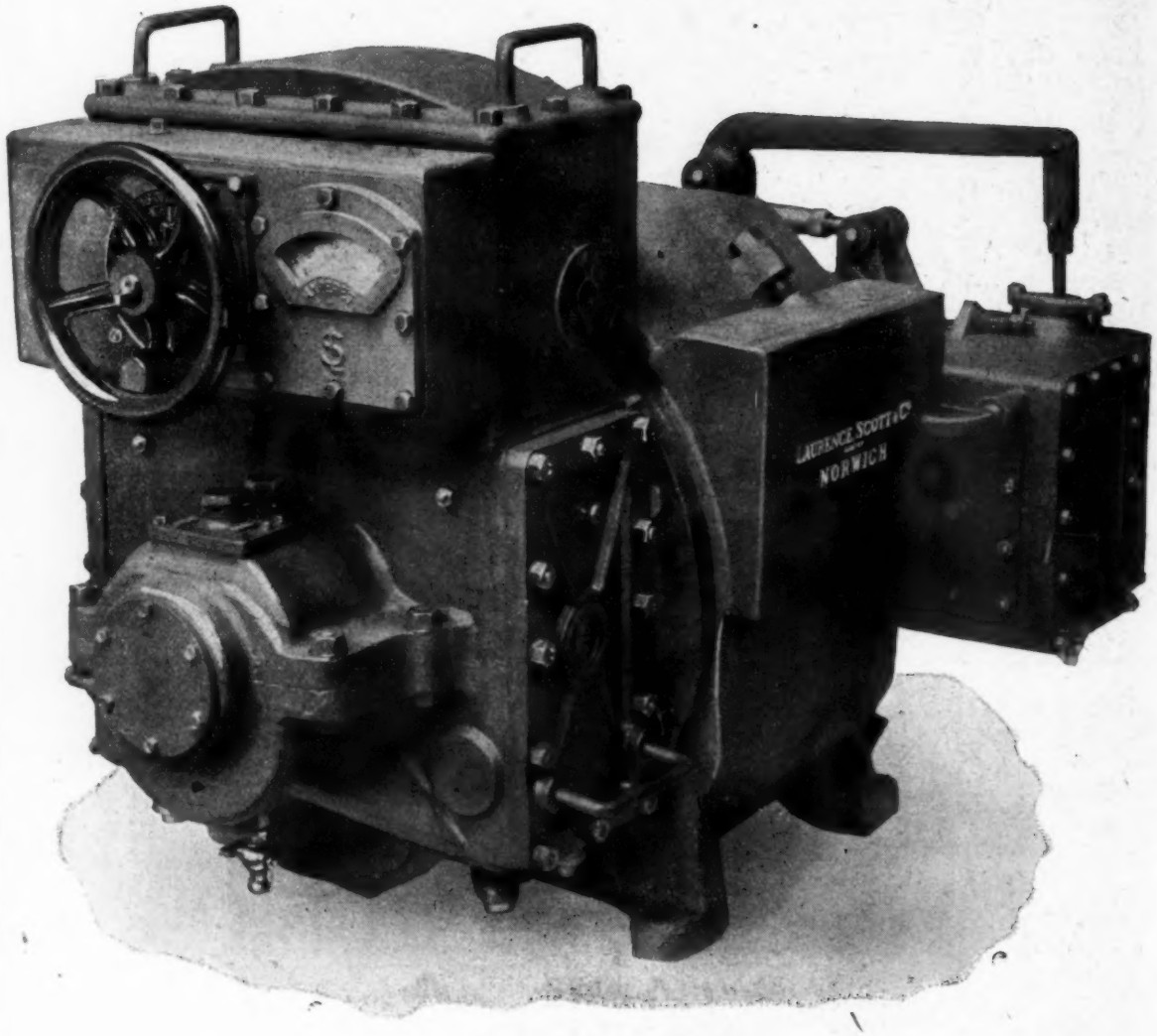


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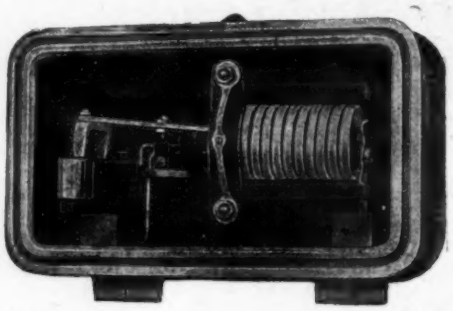

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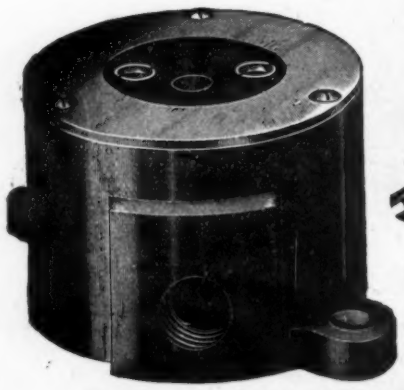

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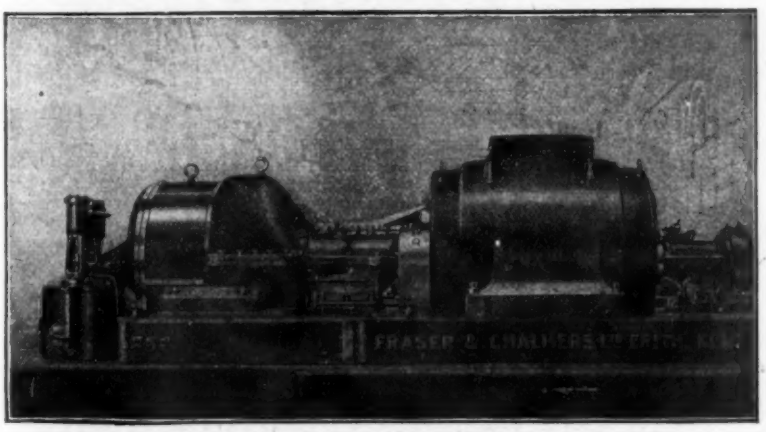

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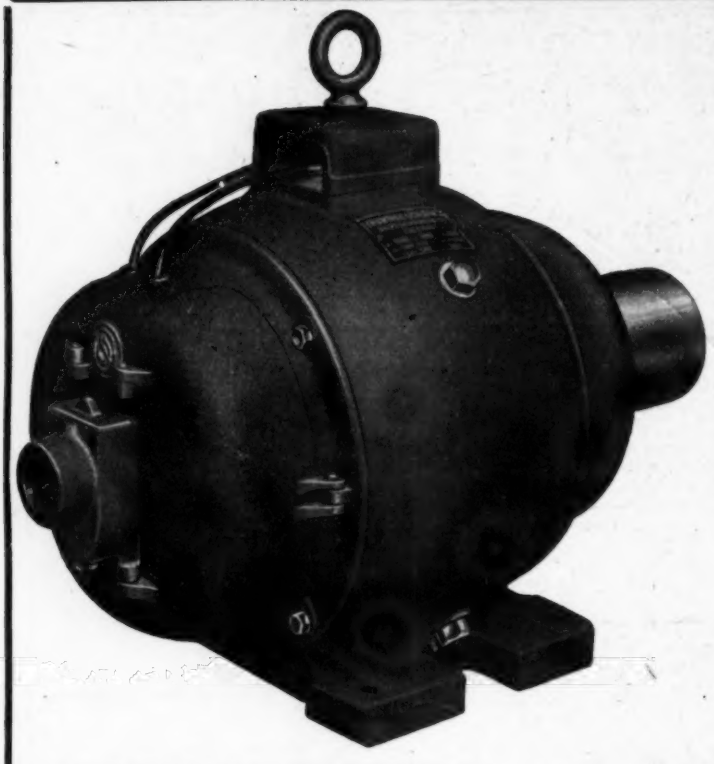

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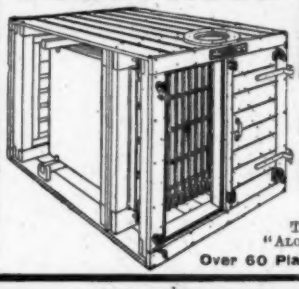

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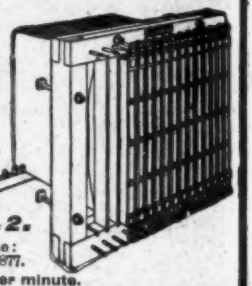

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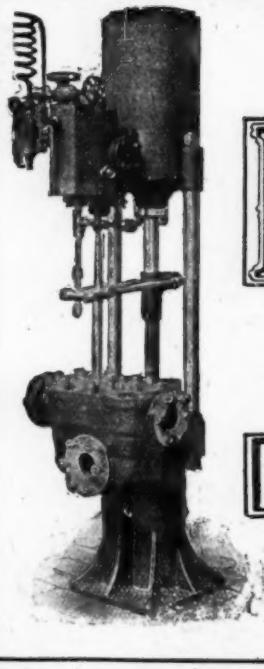

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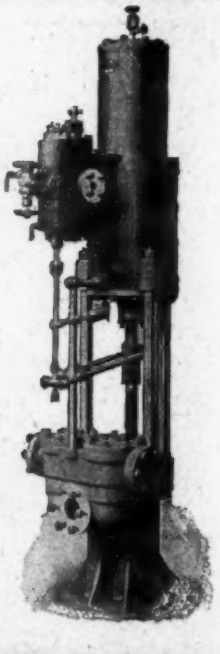

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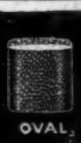

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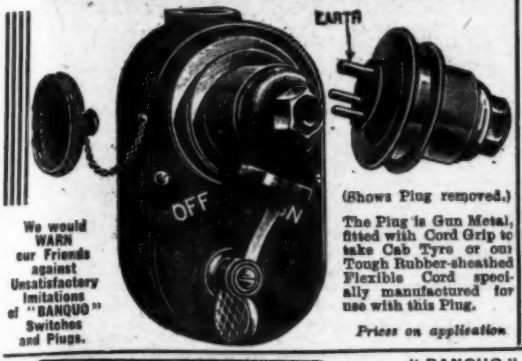


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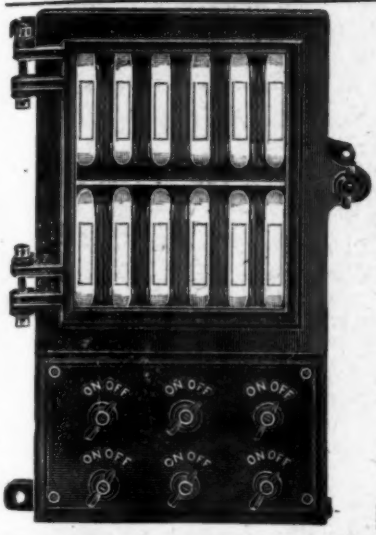


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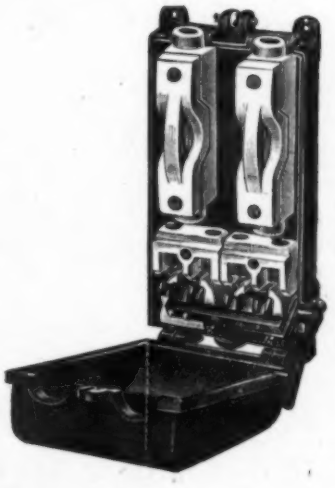

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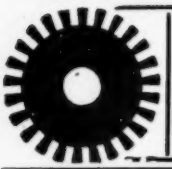
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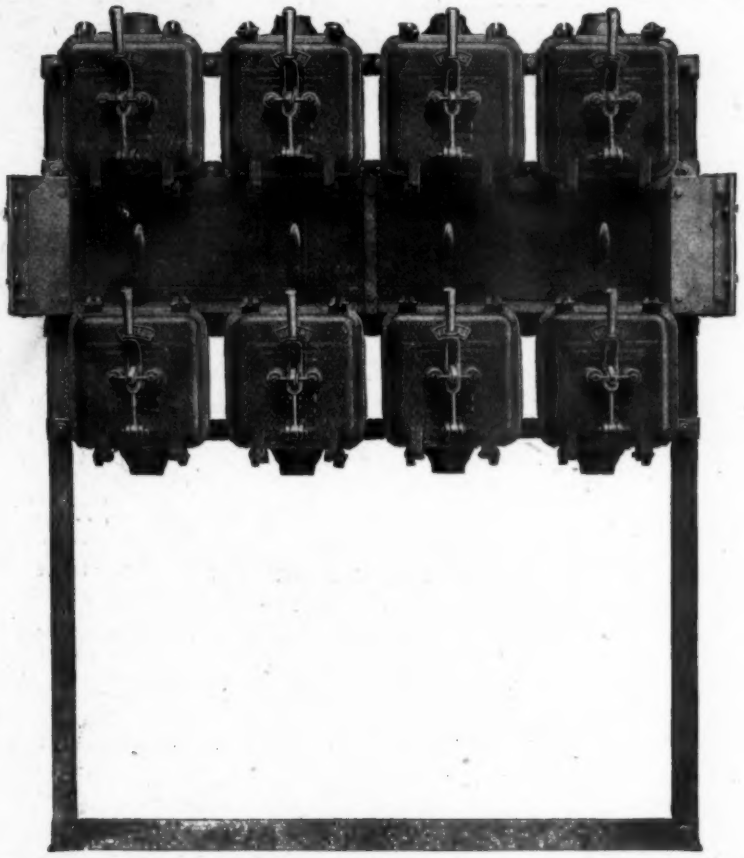
**Totally enclosed.** **For voltages up to 500.**



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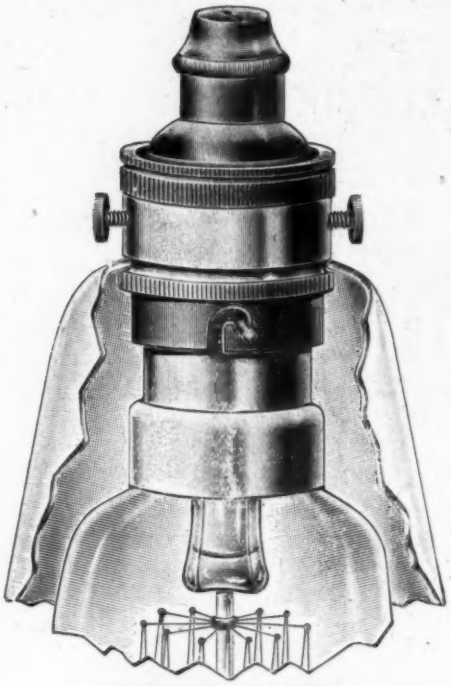
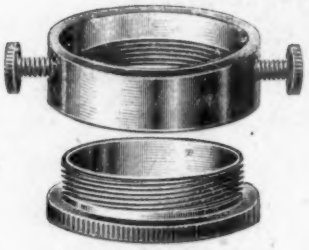
**NOTTINGHAM:** F. Mansfield, 197, Station Road, Beeston, Notts.
**SWANSEA:** W. Ogden Dayson, 1, Mount Street.
**YORKSHIRE and THE TEES:** F. MacCallum, Austhorpe Road, Crossgates, Leeds.
**SHEFFIELD:** H. E. Ridley, Park Road, Wadsley Lane.

G.E.C.



"EASIFIX" Lamlok SHADE CARRIER IN POSITION.



"EASIFIX" Lamlok SHADE CARRIER only.

# THE NEW "Easifix" (LAMLOK PATENT 111978)

# Shade Carrier

## Saves Time, Trouble and Temper.

The **"EASIFIX"** Shade Carrier is **likely to revolutionize shade carrying methods hitherto existing,** as by its adoption shades can be attached to the lampholder or removed in an extremely easy manner in a few seconds.

This naturally is conducive to the more regular cleaning of shades, which s advantageous from both the illuminative and hygienic standpoints.

The **"EASIFIX"** Shade Carrier **is suitable for almost all existing lampholders and shades with the standard $1\frac{1}{2}$" diameter hole.** The old screwed shade rings with their troublesome "cross threading" and "binding" habits can therefore be entirely dispensed with, the **"EASIFIX"** Carrier being substituted in their stead.

The **"EASIFIX"** method of attachment is clearly shown in the illustrations.

The **"EASIFIX"** Shade Carrier is supplied either as a separate device for attachment to existing lampholders, or as a complete unit with lampholder.

**Sample Carrier, together with further particulars and prices, sent upon application.**

Ask for Leaflet S. 2182.

# The General Electric Company, Ltd.,

## Head Office: Queen Victoria Street, London, E.C. 4.

*Telephones:* London Wall No, 3600 (32 lines). *Telegrams:* "Electricity Cent., London."

**BRANCHES—**

**Manchester**—Victoria Bridge.
**Liverpool**—Church Alley.
**Leeds**—Wellington Street.
**Sheffield**—Angel Street.
**Glasgow**—Waterloo Street.
**Cardiff**—Womanby Street

**Bristol**—Victoria Street.
**Swansea**—Wind Street.
**Newcastle-on-Tyne**—Gallowgate.
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**Southampton**—High Street.
**Aberdeen**—Bridge Street.
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REGISTERED TRADE MARK

THE "ELECTRICAL REVIEW"

# CHEAP PREPAID ADVERTISEMENTS

Relating to Situations Vacant, Situations Wanted, Businesses Wanted, Businesses for Sale, Patents for Sale, Specific Articles of any kind Wanted, or for Sale or Exchange, are inserted at the rate of ONE PENNY per Word (minimum 1s.). Box Number and "Electrical Review" Address count as Seven Words.

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**OFFICIAL NOTICES, &c., 1s. per line in Column.**

The ELECTRICAL REVIEW is the recognised medium of the Electrical Trades, and has by far the LARGEST CIRCULATION of any Electrical Industrial Paper in Great Britain.

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## SITUATIONS VACANT.

**Latest time for receiving 9.30 a.m. Thursday.**

*If letters are not to be delivered to certain firms or individuals (if known), instructions to that effect should be sent to the Manager of the ELECTRICAL REVIEW, who will do his best to carry out such instructions. Letters of applicants cannot in such cases be returned to them, nor can the names of Advertisers using a number in any way be disclosed.*

**Original Testimonials should never be sent.**

### SUPERINTENDENT EMPLOYMENT DEPARTMENT.

FOREMAN wanted by large electrical concern to take charge of manufacture of electrical instruments for industrial purposes. Applicant must be able to supervise both male and female labour on machining and assembling operations, fix piecework prices, and have had experience in a responsible position on similar work. Permanent and progressive position. No one already on Government work will be engaged.

Apply, with particulars of experience, age, and salary required, to your nearest EMPLOYMENT EXCHANGE, mentioning No. A 6123. 2786

### DRAUGHTSMEN.

DRAUGHTSMEN urgently required by an Admiralty Department (London):—

(*a*) Three Mechanical Draughtsmen with good all-round experience in mechanical engineering.

(*b*) One Electrical Draughtsman, preferably with experience in telephone or wireless work.

Applicant must have had some workshop experience and sound technical training.

Apply, giving full particulars of experience and training, state also age, salary required, and when at liberty, to—

2849, ELECTRICAL REVIEW, 4, Ludgate Hill, London, E.C. 4.

### SHIFT ENGINEER WANTED.

SHIFT ENGINEER wanted for certified Electricity Works, with experience in three-wire D.C. Generating Plant. Wages £3 5s. per week of seven 8-hour shifts.

Applications giving particulars of experience, together with copies of testimonials, should be addressed to the MANAGER, Electricity Works, Hamilton, Scotland. 2843

## SITUATIONS VACANT.—*Continued.*

### SENIOR ASSISTANT ELECTRICAL ENGINEERS.

REQUIRED for Power and Sub-station work for North-East Coast. Preference will be given to men who have been discharged from the Army or Navy.

Applicants must have had experience with 3-phase generators and rotary converters.

Wages 70s., plus 12½ per cent., per week.

Fourteen days' holiday per annum will be granted with full pay.

Applications, in writing, giving full particulars of theoretical and practical training, together with copies of references and date on which duties could be commenced, should be addressed to 2868, ELECTRICAL REVIEW, 4, Ludgate Hill, London, E.C. 4.

### COUNTY BOROUGH OF ST. HELENS.

DISTRIBUTION ENGINEER, salary £280 per annum. To be responsible for E.H.T. three-phase, and L.T., A.C. and D.C. distribution systems in connection with power, lighting and tramways.

Applications, giving full particulars, with copies of not more than three testimonials, to be sent to the undersigned not late than 22nd OCTOBER next.

E. M. HOLLINGSWORTH,
*Borough Electrical Engineer.* 2801

### SWITCHBOARD ATTENDANT.

WANTED, Switchboard Attendant conversant with E.H.T. 3-phase and D.C. three-wire Switchgear and running of Turbo-Alternators, Rotary Converters, &c. Salary 65s. per week, inclusive of all recognised awards, plus a sum dependent on conditions.

Applications stating age and experience, with copies of testimonials, endorsed "Switchboard Attendant," to be sent in, on or before MONDAY, OCTOBER 14th to P. P. WHEELWRIGHT, M.I.E.E., Borough Electrical Engineer, Jubilee Street, Blackburn. 2778

### SHIFT ENGINEER.

SHIFT ENGINEER wanted at once (controlled undertaking); experience of B. & W. Boilers, Turbo-Alternators, and E.H.T. A.C. Supply essential. Salary £3 17s. 6d. per week (inclusive of all bonuses to date), plus overtime rate for any additional time worked.

Apply, stating particulars of age, training and experience, with copies of recent testimonials, to—

THE ENGINEER,
Electricity Works, Redditch, Worcestershire. 2771

### SHIFT ENGINEER.

SHIFT ENGINEER at the Eccles Corporation Electricity Works (Certified Undertaking). Must have good electrical and mechanical experience. Wages £3 10s. to £3 15s. per week (inclusive of all bonuses), according to qualifications. Applications, stating age, experience, when at liberty, &c., with copies of recent testimonials, to be forwarded forthwith, to the BOROUGH ELECTRICAL ENGINEER, Electricity Works, Cawdor Street, Patricroft, Lancs. 2869

(*Continued on next page.*)

## SITUATIONS VACANT.—*Continued.*

### SOUTH SHIELDS CORPORATION.

*Electricity Department.*

CHARGE ENGINEER.

REQUIRED immediately, Charge Engineer, with experience of A.C. and D.C. Turbine and Reciprocating Plant, Rotary Converters, &c. Wages for 7 shifts of 8 hours (56 hours per week), £4 4s. 11½d. per week (including all bonuses to date), and 14 days' holiday per annum with pay.

Apply, stating age and experience, together with copies of testimonials, to the undersigned, stating date for commencing duties from date of appointment.

HARRY S. ELLIS,
*Borough Electrical Engineer.* 2859

### SHIFT ENGINEER.

SHIFT ENGINEER wanted by Municipal (Certified) Undertaking in the North of England. Wages, including all bonuses, £4 per week.

Applications, stating age and qualifications, to be in not later than WEDNESDAY, the 16th instant, to—

2813, ELECTRICAL REVIEW, 4, Ludgate Hill, London, E.C. 4.

### SHIFT ENGINEER.

WANTED, a Shift Engineer at the Stretford Electricity Station.

Applications, stating experience, to be addressed to R. ROWLAND, Engineer, Electricity Works, Chester Road, Stretford, from whom particulars as to wage and bonus may be obtained. 2833

### JOINTER WANTED.

JOINTER wanted for certified Electricity Works, accustomed to V.B. and Armoured Cables. Wages 72s. 6d. per week of 56 hours.

Apply, stating age and experience, together with copies of testimonials, to the MANAGER, Electricity Works, Hamilton, Scotland. 2841

### SWITCHBOARD ATTENDANT.

SWITCHBOARD ATTENDANT wanted in Lighting and Traction Station. Wages according to experience.

Applications, with references, stating experience, age, &c., to be sent to BURGH ELECTRICAL ENGINEER, Perth. 2785

### MAINS ASSISTANT.

MAINS ASSISTANT required in the North of England; discharged soldier preferred. Salary £3.—State age, experience, to 2808, ELECTRICAL REVIEW, 4, Ludgate Hill, London, E.C. 4.

### DRAUGHTSMEN.

DRAUGHTSMEN required at Portsmouth, for electrical work. State age, experience and salary.

Replies to Box 612, WILLINGS, 125, Strand, London, W.C. 2812

### SHIFT ENGINEER.

SHIFT ENGINEER required for 3-wire D.C. station in Midlands. No night shift.

Reply, stating age, experience and wages required, to 2767, ELECTRICAL REVIEW, 4, Ludgate Hill, London, E.C. 4.

**Cheap prepaid Advertisements are inserted under this heading at the rate of One Penny Per Word (minimum 1s.). Three Consecutive Insertions for the price of two, if ordered and prepaid with first insertion.**
**Box Number and ELECTRICAL REVIEW address count as seven words.**

A SHIFT Engineer wanted by power company in North of England. Permanency. Commencing salary £20 12s. 6d. per month, inclusive of all bonuses.—2839, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

AN Electrical and Mechanical Engineering Firm (Westminster) has a vacancy for a General Clerk. No person resident more than 10 miles away, or already on Government work, will be engaged.—Address, with particulars, age, salary, &c., to W. G. WALKER & Co., Emery Hill Street, Victoria Street, S.W. 1. 2837

ARMATURE Winders, used to repair shop, D.C. work. No person resident more than 10 miles away, or already on Government work, will be engaged.—Apply H. D. & S., 32, Newington Causeway, S.E. 1686

ASSISTANT (technical), for Patent Agent's Office in London. Must be of good education, with a knowledge of engineering, both electrical and mechanical. Acquaintance with the French and German languages would be an advantage. Sedentary employment suitable for rejected, discharged or disabled service man. Good salary.—Write Box 945, Sells Ltd., 168, Fleet Street, E.C. 4. 2811

## SITUATIONS VACANT.—*Continued.*

BOILER House Foreman wanted, London suburb, Certified Undertaking. Capable of taking charge of boiler house and carrying out repairs to boilers and plant. Wages 45s., plus 20s., plus 12½% for 54-hour week.—Apply, stating age, experience, &c., to 5654, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

CHARGE Engineer wanted, D.C. lighting and traction E.H.T. rotary. London district, Certified Undertaking. Salary, including bonuses to date, £200 per annum.—Apply, giving particulars of experience, age, &c., to 5655, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

CLERK, electrical conduit trade, as assistant to manager; knowledge of shorthand and typing essential. Permanent post to reliable man. No person resident more than 10 miles away, or already on Government work, will be engaged.—Apply personally, METALLIC SEAMLESS TUBE Co., 13, Charterhouse Buildings, Goswell Road, E.C. 5735

COIL Winder wanted by manufacturers of control gear. Must be capable of taking charge of winding department. No person already on Government work will be engaged.—Apply, giving age, wages, &c., to your nearest EMPLOYMENT EXCHANGE, mentioning No. A6081. 2727

COMPETENT and fully qualified Buyer wanted by London manufacturing company. Conversant with engineering and instrument materials and parts and sources of supply. Must be energetic and keen buyer. No person on Government work, or living more than 10 miles away, engaged.—Apply, stating age, record of experience and salary required, to 5672, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

COMPETENT Electricians required immediately, full rates. No person resident more than 10 miles away, or already on Government work, will be engaged.—Apply W. T. CLARKE & Co., LTD., Electrical Engineers, 10, Silver Street, W.C. 1. 2757

DESIGN Department, North of England firm, requires Assistant with knowledge of either D.C. or A.C. machine design. Applicant must be over 25 years of age and preferably of low category. No person already employed on Government work will be engaged.—Apply, stating age, experience and salary required, to your nearest EMPLOYMENT EXCHANGE, mentioning No. A5950. 2736

DRAUGHTSMAN, mechanical for engineering works. Good prospects for capable man. No person on Government work, or residing more than 10 miles away, will be engaged.—Write in confidence, stating age, ability and salary required, 2797, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

DRAUGHTSMAN wanted by Croydon firm, used to electrical mechanical work. No person resident more than 10 miles away, or already on Government work, will be engaged.—5697, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

DRAUGHTSMAN-Designer with technical knowledge required for the research department of a well-known firm of switchgear manufacturers. No person already employed on Government work will be engaged.—Apply, stating age, salary and experience, to your nearest EMPLOYMENT EXCHANGE, mentioning this paper and No. 2722.

DRAUGHTSMEN, senior and junior (Tyneside), for switchgear. No person already employed on Government work will be engaged.—Apply by letter, stating age, salary, and experience, to your nearest EMPLOYMENT EXCHANGE, mentioning this paper and No. 2666.

DRAUGHTSMEN wanted, with experience in A.C. and D.C. Machines.—Apply, stating age, experience and salary required to your nearest EMPLOYMENT EXCHANGE, mentioning No. A6069, and this paper. 2798

DRAUGHTSMEN, with experience in electrical instrument work, are required for London Military Establishment.—5721, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

ELECTRIC Fitters.—Several first-class men wanted for Government work; top rates; preferably used to pipe works. No person resident more than 10 miles away, or already on Government work, will be engaged.—'Phone: Croydon 319. 5708

ELECTRICAL Engineers with thorough Commercial experience required as Managers and Assistant Managers for branch establishments entirely engaged on war work. No applicants will be considered who are eligible for military service, or already on Government work.—Apply by letter to MANN, EGERTON & Co., LTD., 177, Cleveland Street, London, W. 1. 5661

ELECTRICAL Instrument Makers wanted for moving coil and wattmeter assembly. No persons already engaged on Government work need apply.—Apply to your nearest EMPLOYMENT EXCHANGE, stating No. 1637. Railway fare paid. 2823

ELECTRICIAN wanted for Colliery in Durham County, with experience in maintenance and repairs to three-phase, high-tension and D.C. machinery; good winder preferred. No person engaged on Government work need apply.—Applications to be sent to nearest EMPLOYMENT EXCHANGE, quoting reference No. A6119. 2768

*(Continued on next page.)*

## SITUATIONS VACANT.—*Continued.*

ELECTRICIAN wanted for maintenance work, ineligible or discharged man; constancy. No person resident more than 10 miles away, or already on Government work, will be engaged.—HELLYAR, 169, Church Road, Barnes, S.W. 13. 5719

ELECTRICIANS urgently required at large Shipbuilding Establishment in Birkenhead; men preferred who have had experience with ship work. No person already employed on Government work will be engaged.—Apply at your nearest EMPLOYMENT EXCHANGE, quoting Reference No. A6128. 2795

ESTIMATING Clerks required for cable works, London district. No person resident more than 10 miles away, or already on Government work, will be engaged.—Applicants with up-to-date experience of all classes of power, light, and telephone cables should write, in first instance, stating age, qualifications and salary required, to 2835, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

ESTIMATING Engineer (assistant) required for sales department of a large firm of electrical machinery manufacturers.—Apply in own handwriting, stating age, experience, and salary required, 2847, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

EXPERIENCED Foreman or Forewoman required to take charge of flashing and mounting department, carbon filaments. No person resident more than 10 miles away, or already on Government work, will be engaged.—9728, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

FOREMAN and Storekeeper wanted by electrical engineers, one accustomed to the manufacture of heating and cooking appliances; discharged soldier considered. No person resident 10 miles away, or already on Government work, need apply.—2687, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

GENERAL Clerk required by electric light and power company near London. Applicant must have had previous experience. Shorthand-typewriting essential. Salary £156 per annum.—2874, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

IMPROVER wanted in a 3-wire D.C. electricity works. Excellent opportunity.—Apply, stating age, training and wages expected, 2789, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

INSTRUMENT Makers, Tool Makers, and Setters wanted for urgent Government work; also Floor Inspector. Must be first-class men. No person resident more than 10 miles away, or already on Government work, will be engaged.—Address FULLER ACCUMULATOR CO., LTD., Grove Road, Chadwell Heath. 2744

ROLLING Stock Superintendent wanted. Previous experience in upkeep and repair of electric cars essential, and preferably with generating station experience. Commencing salary £2 15s., plus war bonus 25s., per week.—THE CHATHAM AND DISTRICT LIGHT RAILWAYS CO., Luton Road, Chatham. 2834

REPRESENTATIVE required for North England, Scotland, and Ireland, with connections and experience. Suitable terms to good man. No person resident more than 10 miles away, or already on Government work, will be engaged.—5712, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

REPRESENTATIVES wanted in London and Provinces, to undertake the sale of Electrical Lighting and Heating Specialities. Applicants must have a good connection amongst electrical contractors, engineers, &c. Good salary and commission to live men. No person resident more than 10 miles away, or already on Government work, will be engaged.—2733, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

SALES Manager wanted for a leading London firm of manufacturers of accumulators, motor car dynamo lighting sets, wires and cables, primary batteries, ebonite, carbons, &c. Must have thorough knowledge of electrical and motor trade, home and export, publicity and catalogues. Good organiser. Excellent opportunity for first-class man. No person resident more than 10 miles away, or already on Government work, will be engaged.—Write, stating experience, salary required, to 2799, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

SHIFT Engineer Junior wanted, A.C. and D.C., Midland power station. Pay £3 weekly, including all war bonuses to date.—Apply with full particulars to 2667, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

SHIFT Engineer wanted for combined Traction and Electricity Supply Station on the South Coast; 70s. per week of 56 hours inclusive of all war bonus, plus overtime.—Apply, stating age, present employment and medical grade, with copies of recent testimonials, to 2846, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

SUB-STATION and Switchboard Attendant wanted, E.H.T. and D.C. rotary. London district.—Apply, stating age, experience and wages required, to 5680, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

SWITCHBOARD Attendant.—Experience of 3-phase distribution for large Engineering firm in Western London District. A discharged soldier with some slight experience would suit.—Write Box 606, c/o Mitchell's Advertising Agency, 1, Snow Hill, E.C. 1. 5682

## SITUATIONS VACANT.—*Continued.*

SWITCHBOARD Attendant required, with a view to taking charge of a shift in a generating station.—State age, experience and wages required, to 2783, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

SWITCHBOARD Attendants wanted. State experience and wages required.—LANCASHIRE POWER CO., Radcliffe, Lancs. 2840

WANTED by Power Supply Company in London, a Junior Assistant. Must have technical training. Good opportunity to gain up-to-date experience in all branches. Previous experience not essential.—5683, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

TESTING Engineer required by Power Supply Co., to deal with the testing of switchgear, instruments, meters, &c. Preference given to applicant with good technical qualifications. Commencing salary up to £3 7s. 6d. per week (including all bonuses), depending on qualifications and experience.—Apply with particulars as to age, medical classification, &c., to 5720, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, Accumulator Erectors and Lead Burners for urgent Government work. No person already employed on Government work will be engaged.—Apply your nearest EMPLOYMENT EXCHANGE, mentioning number A6171. 2864

WANTED, an Assistant (ineligible), for private electrical generating station.—Apply, full particulars experience, age, wages, &c., to SECRETARY, Pryce Jones, Ltd., Newtown, Mid Wales. 2725

WANTED, by a firm in the S.E. district engaged on munition work, first-class Telegraph Mechanics. No person resident more than 10 miles away, or already engaged on Government work, will be engaged.—State age and experience to 6125, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, by leading engineering insurance company, Electrical Surveyors, having good knowledge of the theory and practice of alternating and direct current plant. Applicants must be ineligible for the Army or Navy.—2581, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED by Supply Company in Scotland, Junior Assistant in Mains Department. Applicants should have experience in testing consumers' installations, and preferably some knowledge of three-phase distribution work. Salary about £175 per annum.—Apply, giving particulars of experience, age, &c., to 2832, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, Electrician, fully experienced in maintenance of D.C. motors and wiring. None but qualified man need apply. Permanency for suitable man. Also wireman wanted, used to screwed barrel.—State age, married or single, wages required, to 2824, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, experienced Meter Tester, used to the calibration and repair of alternating-current three-phase and direct-current watt-hour meters.—Applications, stating wage required and when duties can be commenced, to the GENERAL MANAGER, Electricity Department, Dunning Street, Sunderland. 2755

WANTED first-class Winder, capable of winding A.C. and D.C. Motors. State experience, age and wages required.—Apply POWELL DUFFRYN CO., Bargoed. 2830

WANTED, for India, central station, Engineer with full mechanical knowledge. Ineligible for military service. Commencing £400 per annum.—State experience, Z Y 768, care Deacons, Leadenhall Street, E.C. 3. 5706

WANTED, for office in Gloucestershire, Clerk with some electrical knowledge. Good prospects after war for right person.—Apply, with full particulars and salary required, to 2844, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, fully qualified Electrical Meter Repairer.—State age, wage required, in addition to standard bonuses, and enclose references, to CITY ELECTRICAL ENGINEER, Lincoln. 2740

WANTED, General Assistant to Works Manager in an old-established electric lamp factory. Good opening and progressive salary. No person already on Government work will be engaged.—Apply your nearest EMPLOYMENT EXCHANGE, mentioning No. A5667. 2037

WANTED, good all-round Wireman; full union rate, permanent. No person resident more than 10 miles away, or already on Government work, will be engaged.—ELECTRIC LIGHT INSURANCE AND MAINTENANCE CO., 1, Rupert Court, Rupert Street, W. 1. 5681

WANTED, Instrument Makers, Clock Makers, Fitters and Electricians for Wireless Instruments, good wages, permanency for good men. No one already on Government work, or more than 10 miles away, need apply.—COX, Twyford Abbey Works, Acton Lane, Harlesden. 2796

WIREMEN wanted; also good Telephone Repair Hand. No person resident more than 10 miles away, or already on Government work, will be engaged.—Apply F. G. EDEY & CO., LTD., 25, Warwick Lane, Newgate Street, E.C. 5726

*(Continued on next page.)*

## SITUATIONS VACANT.—*Continued.*

WIREMEN Wanted; permanency. Electricity Undertaking in the Midlands. Rate 1s. 3d. per hour, including all bonuses.—Reply, stating age and experience, to 2870, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WORKING Engineer required, to take charge of a shift in a small electric station near London. Experience in similar capacity preferable.—Write, stating age, form of exemption, and wages required, to 2865, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WORKS Manager with special knowledge of mass production of telephones and kindred electrical apparatus, including magnetos for spark ignition. Must be first-class all-round organiser, experienced mechanic, good man of methods, and used to the sole control of large works (2000 employés). Only those having held similar positions need apply. Write only in first instance, stating fully experience, age, and salary required. Liberal terms to man of first-class ability.—STERLING TELEPHONE & ELECTRIC CO., LTD., 210, Tottenham Court Road, W. 1. 2781

YOUTH wanted for Stores in Electrical Engineering Works, Edmonton. Some experience of the trade an advantage. No person resident more than 10 miles away, or already on Government work, will be engaged.—Apply BELLING & Co., Derby Road Works, Edmonton, N. 18. 2818

## APPOINTMENT FILLED.

BOX 2628.—Assistant Electrical Engineer. Applicants for the above are thanked, and informed that the position is now filled. 2800

## SITUATIONS WANTED.

Cheap prepaid Advertisements are inserted under this heading at the rate of One Penny Per Word (minimum 1s.). Three Consecutive Insertions for the price of two, if ordered and prepaid with first insertion.
Box Number and ELECTRICAL REVIEW address count as seven words.

A GENTLEMAN with exceptional experience and technical ability, wants a responsible position with reputed firm manufacturing electrical instruments, meters, or signalling-gear, &c. Excellent testimonials.—5678, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

ADVERTISER desires change to London district, as Shift Engineer, experience with three-wire systems and Diesel engines. State wage offered.—5702, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

AN Engineer, Mechanical and Electrical, with first-class theoretical and practical experience, contemplates change. Accustomed to running and management of large electrical plants. Capable organiser and experienced in the management of men.—5674, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

AN Engineer, with 25 years' experience in mechanical and electrical engineering, accustomed to large plant and to the management of men, seeks position as Manager or Outside Representative.—5616, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

ARMATURE and Stator Winder, 14 years' experience, desires change; good permanent situation, London district.—5731, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

CHARGE Engineer, desires permanent post. 16 years' sound experience A.C. and D.C., &c.; free November 8th.—Mr. B., c/o Baldwin, 47, Cliffe Street, Keighley, Yorkshire. 5716

COMMERCIAL Manager and Buyer, experienced all branches of engineering trade; ineligible; London preferred. — 5710, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

ELECTRIC Motors installed, cleaned and maintained by practical Engineer.—5722, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

ELECTRICAL and Mechanical Engineer desires position as Technical Assistant or buyer; 20 years' varied experience, businesslike and systematic; salary £300.—5734, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

ELECTRICAL Engineer seeks administrative position. Wide experience on erection and maintenance of power stations, batteries, works electrification, designing, estimating; good organiser and administrator.—5657, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

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*(Continued on next page.)*

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*(Continued on next page.)*

## FOR SALE.—*Continued.*

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*(Continued on next page.)*

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15-H.P., 460-volt, series wound, protected Motor, by Westinghouse; speed 600. Condition as new.—DRUMMOND & Co., Middlesbrough. 5692

22-KW., 110-volt, 200-amp., multipolar Zone Generator, with pulley and slide rails; just stopped working.—DRUMMOND AND Co., Middlesbrough. 5693

£25, or offer, Avery-Lahmeyer Dynamo, shunt wound, as new, 25—40 volts, 18—24 amps., two spare gun-metal bushes included. Seen after six.—BURTON, 20, Henecroft Street Slough. 5696

44-KW., 110-volt D.C. Generator, compound wound, three-bearing type, with rope pulley and slide rails; speed 600. —DRUMMOND & Co., Middlesbrough. 5691

70-VOLT, 150-amp., 900 revs. Dynamo for sale, by Dickinson.—Full particulars C. J. FERGUSON & SONS, 54, Chiswell Street, E.C. 1. 2861

100-VOLT "Tricity" Cooker, quite new, £5.—5730, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

190-H.P., six-pole D.C. Motor, by Ernest Scott & Mountain, 500 volts, arranged for rope drive.—HARRY H. GARDAM AND Co., Ltd., Staines. 2827

250-KW. Belliss Alternator Set, comprising a compound enclosed engine, with E.C.C. alternator, 3,000 volts, 50 cycles, in first-class condition, immediate delivery.—HARRY H. GARDAM & Co., LTD., STAINES. 2825

20,000 FLAME Arc Carbons, 6 mm. to 12 mm. diameter, 12" to 25½" long, both metal cored and non-metal cored; also 500 33-mm. 10" cored Carbons; all to be sold cheap.—LAKE, 132, Upper Thames Street, London, E.C. 4. 2793

## ARTICLES WANTED.

### STOCKS PURCHASED.

STOCKS of Cable, Bell and Lighting Accessories, Lamps, &c., purchased for cash. Large and small quantities.

DOUGLAS, Dunedin House,
Basinghall Avenue, E.C. 4. 2675

### STEAM DYNAMO WANTED.

WANTED, Price and Delivery for New or Second-hand 150-KW. direct-coupled Steam Dynamo, by Belliss and Morcom, or other first-class maker, packed f.o.b.

OVERSEAS ENGINEERING CO., LTD.,
75, Curtain Road, London, E.C. 2. 2836

### MOTORS WANTED.

ONE 15-H.P., 400 v., D.C. Motor, new or second-hand. State price and where seen.
One 2-H.P., 230 v., D.C. Motor. do. do.
5687, ELECTRICAL REVIEW, 4, Ludgate Hill, London, E.C. 4.

### METAL FILAMENT LAMPS WANTED.

METAL FILAMENT LAMPS wanted for 30 and 100 volts bayonet cap, 16 to 50 C.P., preferably pear shape. Needed for export.

THE OVERSEAS ENGINEERING CO., LTD.,
75, Curtain Road, London, E.C. 2. 2815

### BATTERIES WANTED.

50 VOLTS wanted for small private house installation; also wiring, switches, and general interior fittings for same.—BLUE BIRD MOTOR CO., LTD., 1, Ebury Mews East, Eccleston Street, London, S.W. 1. (Victoria 3884.) 5686

*(Continued on next page.)*

## ARTICLES WANTED.—*Continued.*

Cheap prepaid Advertisements are inserted under this heading at the rate of One Penny Per Word (minimum 1s.).
Box Number and ELECTRICAL REVIEW address count as seven words.

ACCUMULATORS wanted for refining purposes. Obsolete Generating Sets, Dynamos, Motors, and all kinds of Machinery. Scrap Cable, Arc Lamps, Meters, Metal Residues, and Scrap Metals of every description purchased for prompt cash, town or country.—Apply A. BROWN & SONS, 142, Lower Clapton Road, London, N.E. Telephone: Dalston, 555. Telegrams: Secondhand, Lowclap, London. Established 1860. 4358

A.C. and D.C. Motors (second-hand), any type, any condition, wanted for prompt cash.—A. LEAROYD & SON, Bridge Works, Heatherley Street, Clapton, N.E. 5391

A. LEAROYD & SON, Bridge Works, Clapton, N.E.—Telephone Dalston, 2278; Telegrams: Frangible, Lowclap, London—buys for prompt cash every description of second-hand Generating Sets, Accumulators, Motors, Transformers, old Arc Lamps, Meters, Cable, Scrap Metals, Metallic Drosses, &c., &c. Enquiries solicited. Established over 50 years. 5392

A 1 CASH Prices given for Electric Cable, Flexible Wire, Electrical Accessories, &c.—Apply DAVIS, 11, Sun Street, E.C. 2. 1424

DYNAMOS, Motors, Arc Lamps, Meters, Scrap Cable, Iron, Metals or Machinery purchased for cash in any quantities.—J. HYAMS, 11, Glengall Terrace, Old Kent Road, S.E. Telephone: 3339 Hop. 5158

GENERATOR wanted, 220 volts D.C., 90 KW., for belt or rope drive or for direct coupling, 170 R.P.M., for immediate delivery.—Send full particulars and lowest cash price, W. E. CHIVERS & SONS, Devizes. 2848

GENERATORS, one or two wanted, 60/70 volts, 400/500 amps. D.C. Fullest particulars, lowest terms.—TILNEY, Olympia, Newport. 5457

MODERN compound-wound Generator, 230 volts, D.C. (belt driven), 25/35 KW.—Particulars and price, GATLEY & Co., Todmorden. 2737

NEVILE Automatic Switch wanted for charging battery of 56 cells, to carry up to 35 amperes.—Price and particulars to C. SCRASE DICKINS, Coolhurst, Horsham. 5700

NEW or Second-hand Tubing and Fittings wanted.—WALLACE, 58, High Street, Bloomsbury. 2307

OIL-driven Electric Light Plant wanted, 100 or 50 volts, with battery complete, about 200 to 300 ampere-hours capacity.—5571, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

PLATINUM, in any form and quantity, purchased at highest prices by DERBY & Co., LTD., 44, Clerkenwell Road, London.

PLATINUM Scrap purchased in large or small quantities. Highest market value given.—Before selling elsewhere call or post to the old and reliable firm, THE DEPÔT, 156, Charing Cross Road, London. Established 1850. 5648

POLISHING Linisher Machine for 4" emery band; state price.—NORRIS, 61, Malden Hill Gardens, New Malden, Surrey. 5668

SURPLUS Stocks Electric Cable, Plant, &c., bought for cash; also scrap cable, dynamos, motors, cells, scrap metals, lamp ends, &c.—LAKE, 132, Upper Thames Street, London, E.C. 5473

VACUUM Pump required, preferably of the Edwards three-throw type.—Write, giving full particulars and price, to ABRAM LYLE & SONS, Ltd., Plaistow Wharf, Victoria Docks, E. 16. 2866

WANTED, a few 400-volt, 50-cycle, 3-phase Motors, preferably slip-ring type, 5 to 35 H.P.—8133, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, Alternator, 250/300 KW., 200 volts, three-phase, 50 period, with 330 revs.—A. L. UNDERWOOD, 3, Queen Street, E.C. 4. 5875

WANTED, D.C. Motor, 110 volts, 2 to 4 H.P.—A. DAVEY, Moorland Road, St. Austell. 5713

WANTED, Diesel, or semi-Diesel, Generating Set of 200-KW. capacity, 220 volts, D.C., preferably with converter to run on tar fuel.—PORTHOLME AIRCRAFT CO., LTD., St. John Street, Huntingdon. 2682

WANTED, direct-coupled Set, about 50/75 KW., 220 or 440 volts, D.C., preferably the latter. Full details and price must accompany offer.—2828, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, direct coupled Steam Set Output 4/6 KW. 100 volts, steam pressure 100 lbs.—5699, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, Dynamo; capacity about 600—1000 watts, 100 volts.—Send particulars to N. BROADBENT, 47, St. James's Street, Burnley. 5714

WANTED, Electric Cooking and Heating Apparatus, Kettles, Irons, Vacuum Cleaners, all voltages. Also Electric Bells, Lamps and Arc Lamp Carbons, and all classes of Accessories and Flexibles. — Fullest particulars to 2316, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

## ARTICLES WANTED.—*Continued.*

WANTED, Motor-Generator of approximately following capacities: D.C. Generator, output 130 amps. at 80—100 volts; Motor, 200 volts, single-phase, 50 periodicity.—Offers, with full particulars, to 2710, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, Motor-Generator, 3-phase 50-cycle 415-volt Motor. Generator 800 to 1,200 amps. 30 to 40 volts. Full details.—BARNETT & SOANS, Electricians, Stoke-on-Trent. 5660

WANTED, Motor-Generator, 400 volts, one-phase, or 200 volts, two-phase, to about 70 volts, 80 amps.; also one 440 volts, D.C., ditto.—R. F. WINDER, Cross Belgrave Street, Leeds. 2360

WANTED, new or second-hand Shunt Dynamo, output 30 amps., 100/140 volts, and good Accumulator Switchboard for use with same.—ELECTRICITY WORKS, Inverness. 2845

WANTED, one copy "Electrician," 1917, July 20th.—2738, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, one new or second-hand 45/60-H.P., 500-volt, compound-wound, D.C. Motor.—Price and all particulars to FLETCHER, BURROWS & Co., LTD., Atherton, near Manchester. 2821

WANTED, one 40-H.P., three 12-H.P., two 10-H.P., and two 3-H.P., A.C. Motors for single-phase supply, at 50 cycles, 200 volts, complete with starting apparatus; reliable machines only will be considered; give full details and price.—2860, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, Plating Dynamos, 500 to 1500 amps., 4 to 6 volts, 500 to 1500 amps., 15 to 20 volts; also lead-lined Tanks.—Send full particulars and prices to 5727, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, second-hand, 110-volt, 30-amp. Dynamo, or equal; two ¼, two 1, and one 2-H.P., 220-volt, Motors; also 1 to 15-H.P., 440-volt, Motor. All direct current.—State full particulars and lowest prices, 2831, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

WANTED, small A.C. Motor, ½ H.P., 205 volts, 50 cycles.—10, Lynwood Road, Tooting. 5729

WANTED, small 25 and 50-volt plant, complete.—MORRISON, Birley Street, Blackpool. 2829

WANTED, Steam Cranes, 3 and 5 tons, gauge 4' 8½".—Full particulars to KRYN & LAHY METAL WORKS, Ltd., Letchworth. 2871

WANTED to Purchase or Hire, a 6-volt Dynamo, 1000, 2000 or 3000 amps.; new or second-hand. Also Resistance Boards, 100 to 150 amps.—RILEY MOTOR MANUFACTURING CO., Cunard Works, Coventry. 2809

WANTED, up to 700 yards 7/16 twin-core, paper-insulated, lead-covered, 2200-volt Cable. Also several 6-lb., 220-volt Irons.—Offers to ELECTRICITY WORKS Larne, Co. Antrim. 2814

WANTED, 3 to 7-KW. Generator, for lighting; also 3-H.P. Motor, 220 volts, D.C.—Send full particulars COACH AND HORSES, Hereford. 5725

WANTED, 10-H.P. D.C. Motor, 900 revs. State lowest price.—E. H. K., 33, Furnival Street, E.C. 4. 2817

WANTED, 40-KW. shunt-wound Dynamo, 100/150-volt.—DAVIS, 11, Sun Street, E.C. 2 5705

40-B.H.P. Motor, 220 volts, D.C. for Belt Drive. State speed.—F. B. HELLON, 57, Moorfields, Liverpool. 5656

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ELECTRICAL Engineer and Draughtsman is prepared to undertake, in own time, the design of electrical and mechanical apparatus; also the working out of all details ready for the manufacture of same.—5462, ELECTRICAL REVIEW, 4, Ludgate Hill, London.

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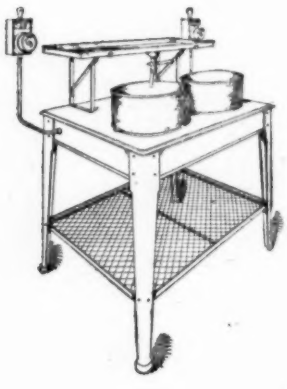

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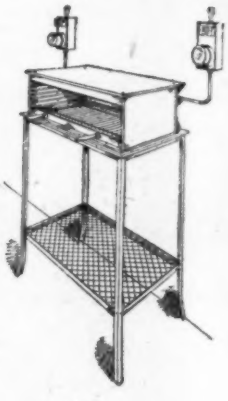

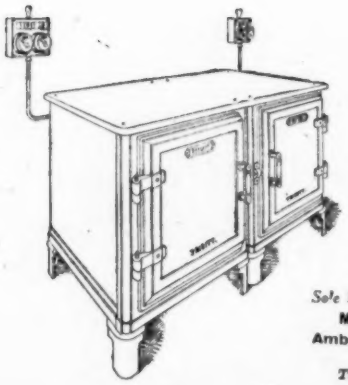

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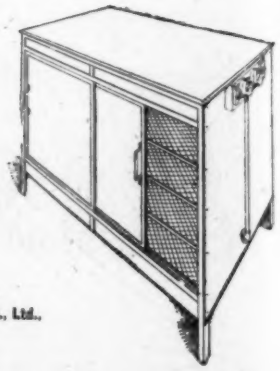

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**Latest time for receiving 9.30 a.m. Thursday.**

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*Queen Anne's Chambers, 28, The Broadway, Westminster, S.W.1.* **Chartered Patent Agent.**

THE PROPRIETOR of British Patent No. 21,881/14, dated November 2nd, 1914, relating to "Machine for Winding Electro-Magnetic Coils," is desirous of entering into arrangements by way of a license or otherwise, on reasonable terms, for the purpose of exploiting the above patent, and ensuring its practical working in Great Britain. All inquiries to be addressed to B. SINGER, 29, So. La Salle Street, Chicago, Illinois. 2723

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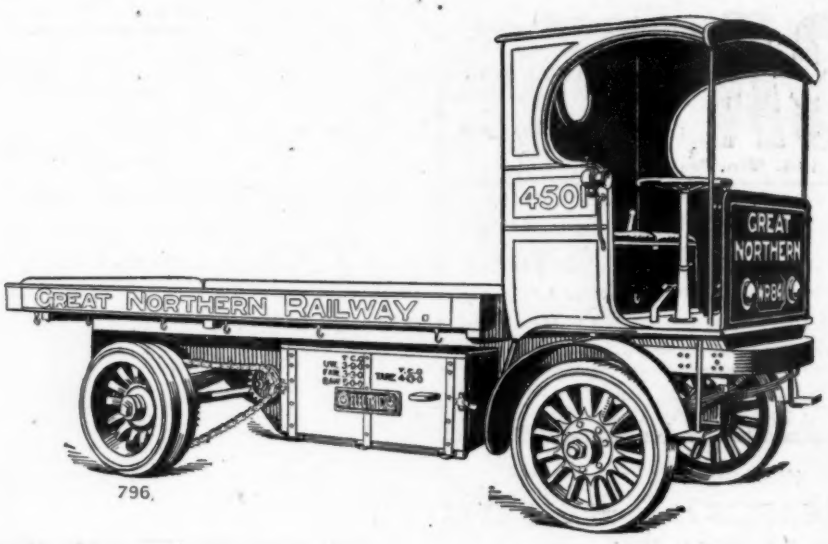


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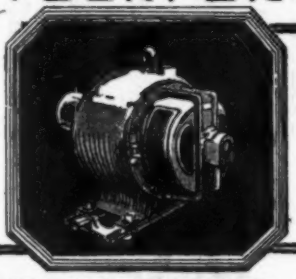

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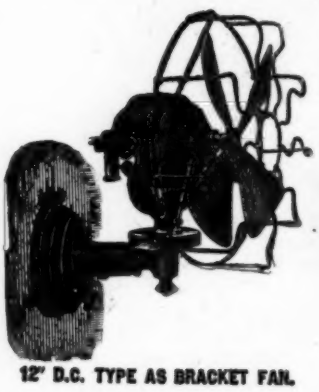

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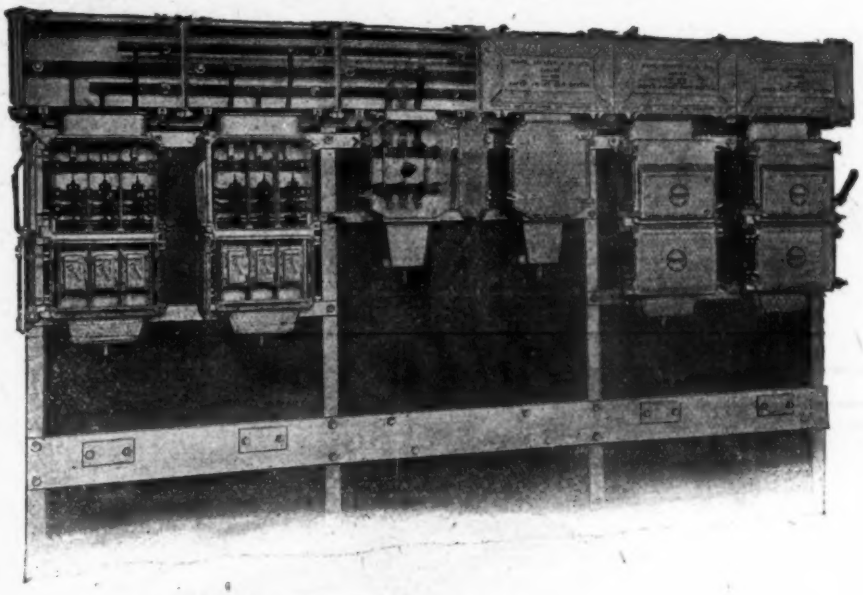

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for Power Centres provides our standard FLUVENT Switch-Fuse for out-going circuits, and permits the medium of either links, a large FLUVENT Switch-Fuse, or an oil switch for incoming circuits.

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## NO Slate or Marble is used.

Specially note that the switches have a parallel break and are fully guaranteed to stand 3,000 volts to earth for five minutes, and to give an insulation test of 50 megohms—invaluable FLUVENT points.

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**Hulme Electrical Works, MANCHESTER.**

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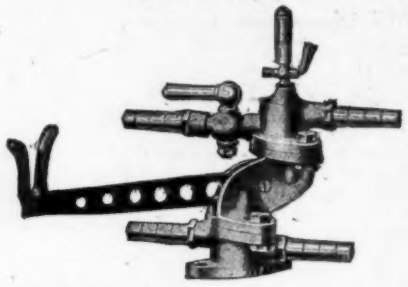
(Patent No. 3353/18.)



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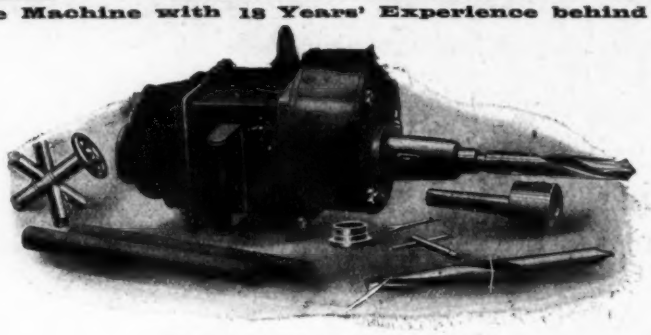

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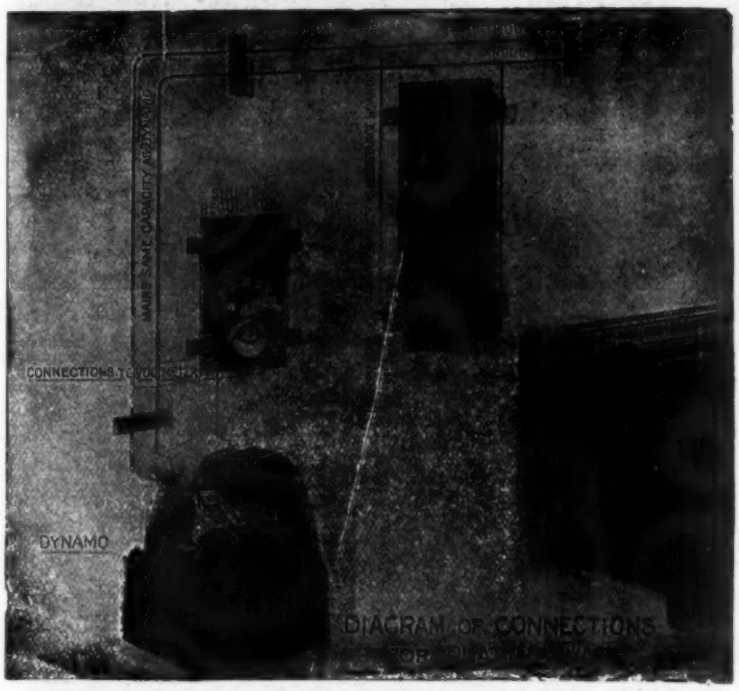


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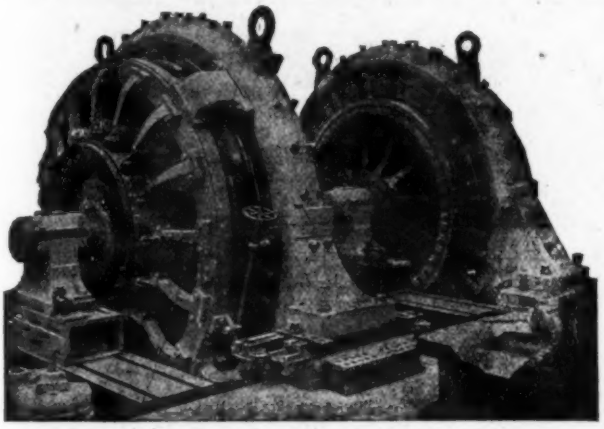

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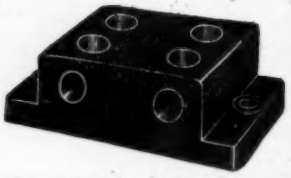

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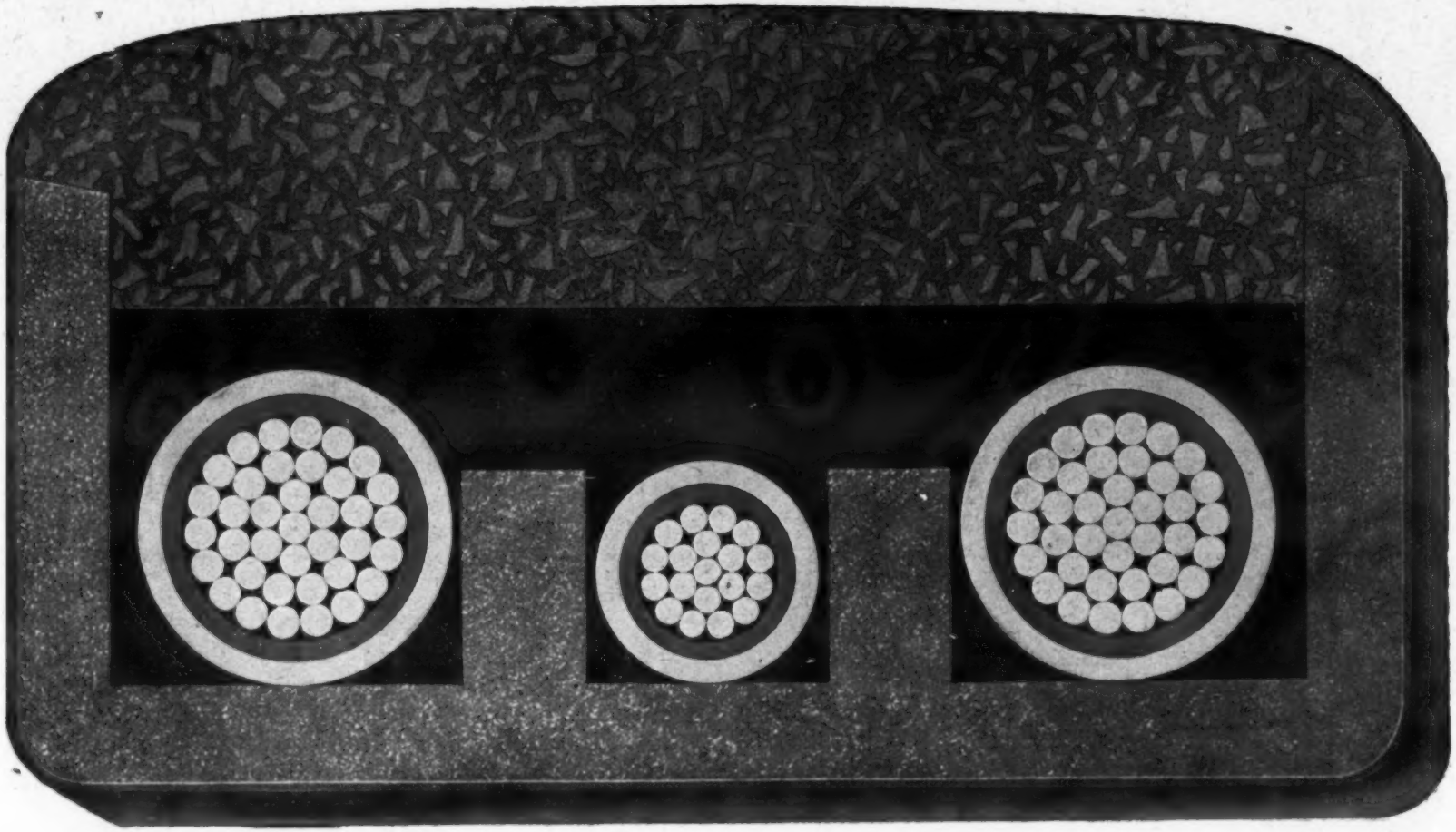

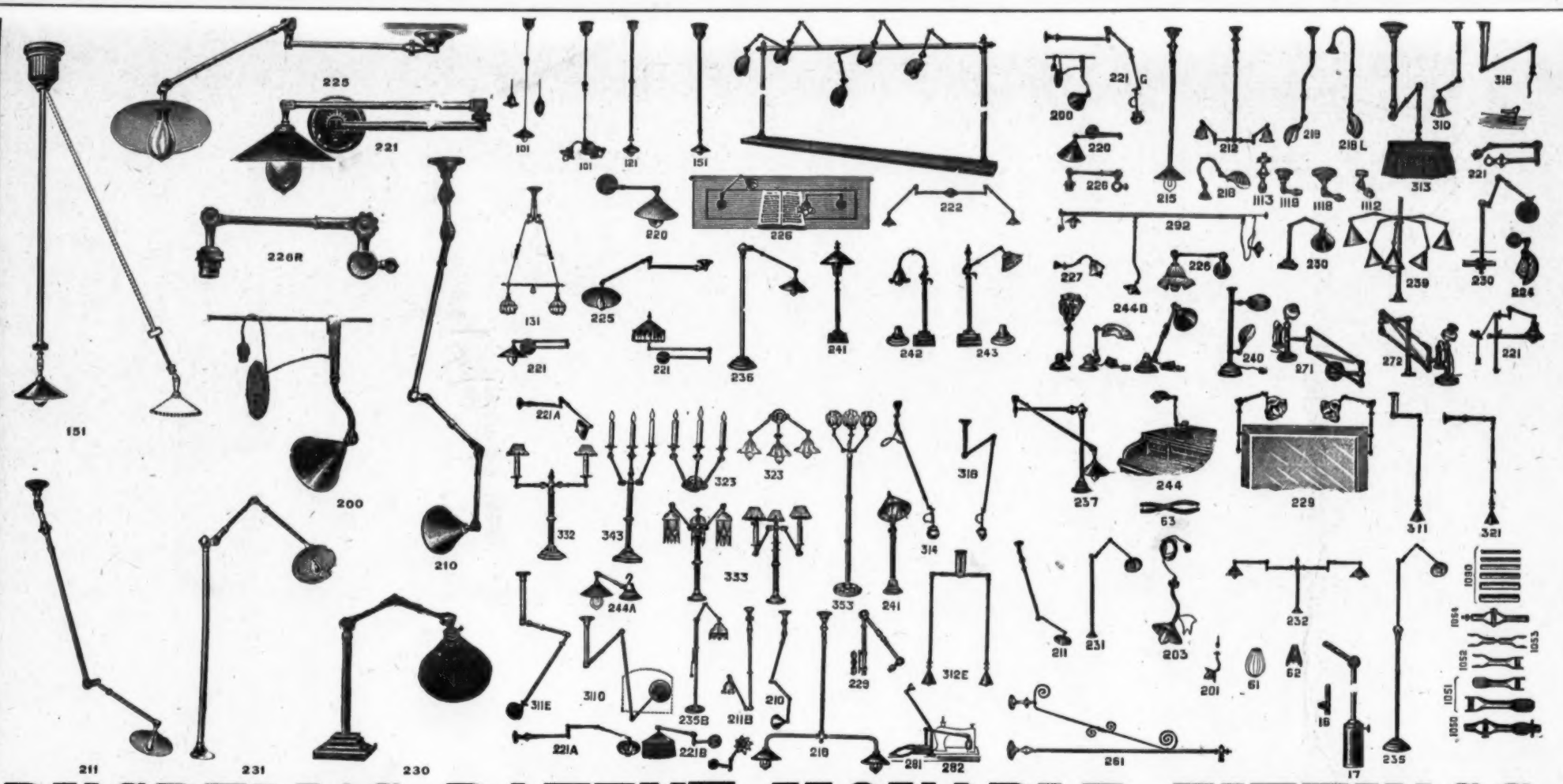


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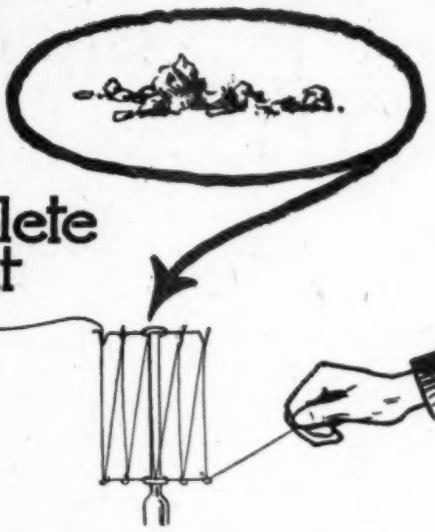

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Process by process the work is carried out by British labour in our London Works. We do not buy the Tungsten Powder or the Tungsten Rod.

We begin with the Ore, refine and reduce it, work it into rod, swage it down, and finally draw down into the finest filaments.

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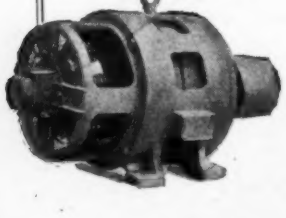

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The workers never slack—the work never slackens.

The output goes steadily on day and night with the consistency of clockwork.

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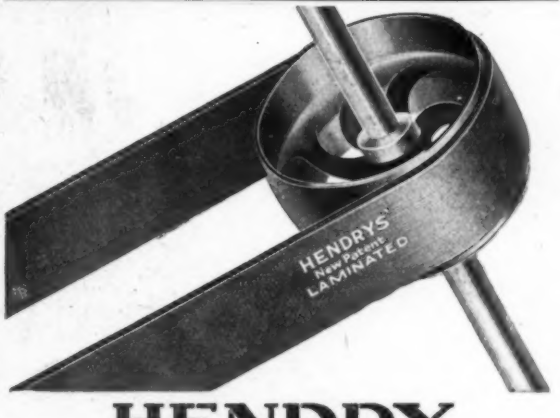


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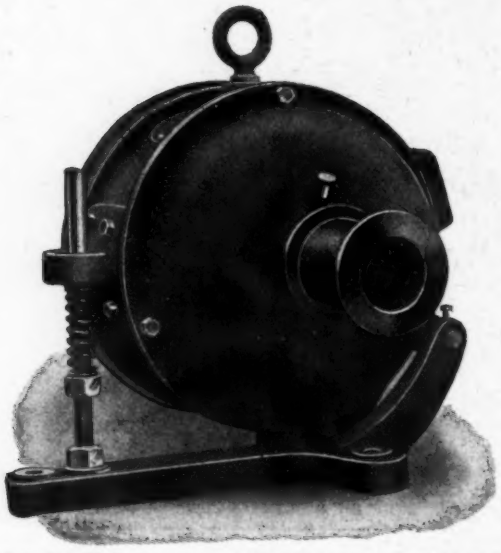

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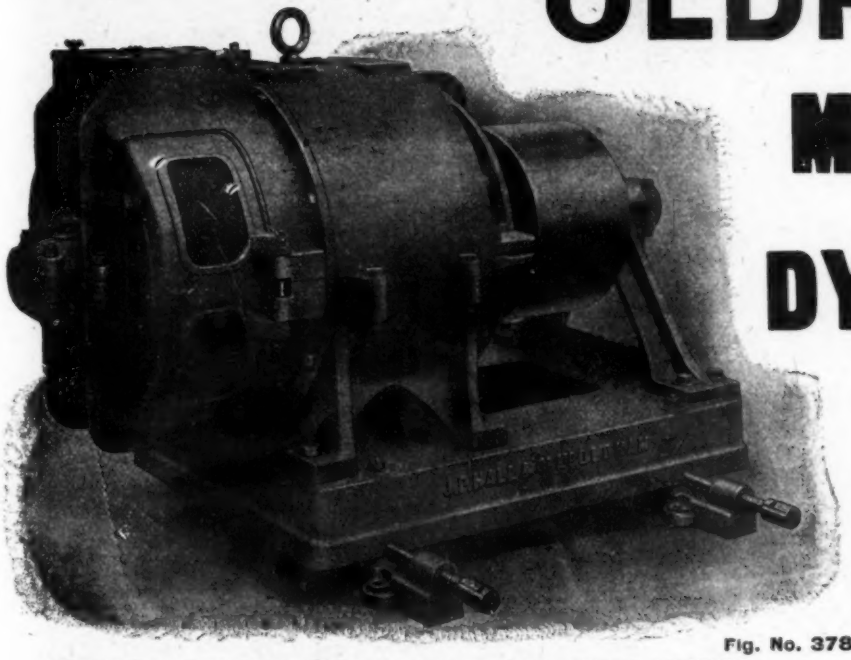

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Fig. No. 378.
60-H.P. D.C. MOTOR WITH BEDPLATE AND OUTER BEARING.

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"Volex" DRY BATTERIES HAVE BEEN Manufactured by us many years previous to the War, and are still superior to the Best of other makes.

## BRITISH MADE DRY BATTERIES for Most lasting Service.

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The principal advantages of Volex Batteries over all others are their remarkable capacity, long life, Efficiency & Durability.

For many purposes the 'VOLEX' BATTERY supersedes accumulators, such as for Ignition, Lighting, operating Electric horns etc.

Special attention is directed to the "VOLEX" STAND-BY BATTERY for starting Ford Cars.

| TYPE | VOLTS | SIZE. | PRICE |
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| DUO | 3 | 6¼ × 2½ (Circular) | 7/6 |
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is a First-class Battery for Electric Bell, Telephone, Medical and similar purposes.

No. 174—Size 6½" × 2½".

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We make a fine range of sizes, and shall be pleased to quote prices on application.

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SIZE, 8½" × 2¾". WEIGHT, 2¼ lbs.

COMPLETE WITH "VOLEX DUO" BATTERY AND BULB,

**21/-** EACH (Subject).

FROM 100 TO 150 HOURS' LIGHT IN USE.

The "Doralite" Lamp is of handsome appearance, strong construction and best finish, and is highly recommended for inspection and other service.

SPARE "VOLEX DUO" BATTERIES, List No. 4, **7/6** EACH.

The "VOLEX DUO" Battery supplied holds up well in stock, and is quite suitable for export.

**Ward & Goldstone** SALFORD MANCHESTER

LIGHTS O' LONDON *(with special reference to Osram).* NO. 1.

# AT SELFRIDGE'S.

Because a great store must show its commodities in the best possible light—because the volume of lighting entails the use of the most durable and economical lamp—because a firm with a reputation for integrity pins its faith to a lamp with a reputation for dependability and efficiency—these are the reasons why you will find the word "Osram" on the lamps at Selfridge's.

*Advt. of The General Electric Co., Ltd. Head Office: Queen Victoria Street, London, E.C. 4.*

Printed by WILLIAM CATE, LTD., 147-150, Saffron Hill, E.C. 1, and Published by the Proprietors, H. ALABASTER, GATEHOUSE & KEMPE, 4, Ludgate Hill, London, E.C. 4.

**Newcastle-under-Lyme.**—Price Increase.—The T.C. has agreed to the recommendation of the Electricity Committee that, as from October 1st last, the war advances on lighting and power charges be 50 per cent.

**New Zealand.**—The importance of the Electric Power Board's Bill to agricultural and pastoral interests in New Zealand was the subject of a recent address before a Conference of the New Zealand Council of Agriculture by the President of the South-land League. He stated that the Electric Power Boards Bill, which had already been laid upon the table of the House of Representatives by Sir Joseph Ward, was drafted with two objects in view: first, to make it possible for a Board elected by the ratepayers to generate electric power and distribute it within any district not coming within the scope of any existing or contemplated Government scheme; and, second, to purchase electrical energy from the Government or other available source and distribute it within a defined area. Such a measure would make it possible for farming districts to have equal facilities with the towns so far as electrical energy was concerned. It would also eliminate the present tendency—due to the electrification of the towns—for the people to drift into them from the country.

Provision was made whereby the Board might supply power to consumers within the boundaries of an "outer area" at special rates, and—with the approval of the Governor-General—two or more districts might "link up" their systems or amalgamate their undertakings, to their mutual advantage. A resolution was passed by the Conference urging the necessity for a State hydro-electric scheme.

**Plymouth.**—Price Increase.—The E.L. Committee has increased the charges for electricity, from October 1st last, by ½d. for lighting purposes, making 4½d. per unit, and by ¼d. per unit for power.

**Salisbury.**—Price Increase.—The E.L. Co. has increased the price of electricity, from October 1st last, by a further 10 per cent., with a maximum of 8d. per unit.

**Silsden.**—Proposed E.L.—By the casting vote of the chairman, the U.D.C. has decided not to entertain the overtures made by the Yorkshire E.P. Co. for the discussion of lighting projects.

**Skelmanthorpe.**—Prov. Order.—The U.D.C. has approved the application of the Electrical Distribution of Yorkshire for a prov. order to supply electricity within its area.

**St. Helens.**—Price Increase.—The Electricity Committee has increased the charges for energy for lighting and power by a further 20 per cent.

**Warrington.**—Year's Working.—The income of the Corporation electricity department for the past year was £50,334, and the expenditure £35,904, leaving a gross profit of £14,430, compared with £12,626 in the previous year. The net profit was £5,024, against £4,171, and this favourable result was largely due to the enhanced price received for motors and fittings. A sum of £2,000 was appropriated for relief of the rates. The total capital expenditure to date is £146,710, and the debt outstanding, £105,942; the reserve fund amounts to £11,000, and the sinking fund to £11,125.

**York.**—Price Increase.—The Electricity Committee recommends that the price of electricity be advanced to 50 per cent. above pre-war rates.

## TRAMWAY AND RAILWAY NOTES.

**Australia.**—Queensland.—A Bill has been introduced in the Legislative Assembly providing for the purchase of the Brisbane tramway undertaking by the Government, and its subsequent control by the municipal authorities.

**Barrow-in-Furness.**—Unsatisfactory Service.—The Corporation has arranged for a deputation to meet the B. of T. respecting the unsatisfactory tramway service in the town, and Messrs. Vickers and the Tramway Co. have been asked to send representatives to the meeting. The Corporation has instructed the Parliamentary Committee to consider the promotion of a Bill authorising the Corporation to run a motor-bus service.

**Batley and Birstall.**—Unsatisfactory Service.—The local Chamber of Commerce and the Tradesmen's Association are to wait upon the Yorkshire (Woollen District) Electric Tramways Co. to express their dissatisfaction with regard to the service and fares on the company's system.

**Birmingham.**—Wages.—The Committee on Production has awarded an increase of 3s. 6d. per week to Corporation electricity and car-shed employés over 18, and 1s. 9d. to those under 18. Non-certified department workers are to receive 5s. per week if over 18, and 2s. 6d. if under 18; the award in connection with the traffic department of the tramway undertaking has been deferred pending the national movement between the National Transport Workers' Federation and the Municipal Tramways Association.

**Bradford.**—Accident Claims.—The compensation claims arising out of the recent tramway accident at Allerton, by which a driver lost his life and a number of passengers received injuries, have been settled. There were 22 claims, and the total amount of allowances was £1,237.

Parcel Service.—The Traffic and Fares Sub-Committee recommends that the advance of 25 per cent. in parcel rates on the tramways, sanctioned by the T.C. on October 10th, 1916, be increased to 50 per cent.

**Bristol.**—The Corporation has referred to its Docks Committee a suggestion that the railway companies, the Road Board, and the Corporation should construct a tunnel suitable for rail and road transport under the River Avon between Avonmouth and Portishead.

**Continental.**—Austria.—An advertisement of the Austrian Siemens-Schuckert Werke gives some particulars of the new railway line from St. Pölten to Mariazell. It is 91·3 km. long and of 760-mm. gauge. The greatest gradient is 27 per cent.; the pressure of the line conductor is 6,000 volts, at 25 cycles per second. The weight of the locomotives used is 47 tons, and each is fitted with two 250-H.P. motors. The normal speed is 35 km. per hour, and the normal tractive effort of each locomotive 3,800 kg.

It may interest our readers, says the *Scientific American*, to learn that the Vienna tramway conductresses are dressed from head to foot, including their boots, in paper.

Switzerland.—It is reported in the daily Press that a strike of tramway servants is in progress at Geneva.

**Glasgow.**—Skip-stop System.—The Tramways Committee, for the purpose of economising power, has adopted the skip-stop system on certain quiet routes.

**Hull.**—Year's Working.—There was a gross surplus of £41,297 on the working of the Corporation tramway department for the year ended March 31st last, the income being £188,219 and the expenditure £146,922. Passengers carried numbered 63,089,709, and 4,124,851 car-miles were run. In the previous year the respective figures were:—Surplus, £43,411; income, £164,190; expenditure (not including payments to employés with H.M. Forces), £120,779; passengers, 54,125,213; and car-miles, 4,200,426. The working expenses included traffic expenses, £70,004 (4·07d. per car-mile); general expenses, £13,592 (·79d. per car-mile); repairs and maintenance, £37,114 (2·16d. per car-mile); power expenses, £17,740 (1·03d. per car-mile); and allowances to employés with the Forces, £8,470. Interest on loans amounted to £17,820; loan instalments to £16,150; £3,069 was contributed to the borough funds, and £8,751 to the reserve fund.

**Ilford.**—Electricity Charges.—The Electricity and Tramways Committees, at a joint meeting, decided that electricity supplied for traction purposes, for the year ended March 31st last, be charged for at 1½d. net per unit.

**London.**—A decorated tramcar, lent by the L.U.T., was used as a travelling bank at Ealing and Acton this week in connection with the War Loan campaign.

At Brentford on Saturday night a L.U.T. tramcar failed to take the points and was derailed.

**Paisley.**—E.S. Failure.—Owing to a breakdown at the electricity works on Thursday, last week, the Paisley and district tramway service was held up for several hours; later, energy was obtained from the Clyde Valley Co., and the cars were able to return to the depôts.

**Reading.**—Year's Working.—The accounts of the Corporation tramways for the year ending March 31st last show a net capital expenditure of £230,789, against £231,629 last year. The revenue was £44,597, against £56,797, and the expenditure £38,874, against £48,397, leaving a net surplus for the year of £5,723, against £8,400 last year; £1,723 was put to the reserve fund, which now stands at £24,122, and £4,000 went to the relief of rates. The sinking fund stands at £80,183. The passengers carried during the year numbered 10,919,533, a decrease of 2,852,065; the units generated were 1,299,968, a decrease of 101,992, at a cost per unit of 1·38d., against 1·53d. last year.

**St. Helens.**—Tramway Lease.—The Corporation is negotiating with the Tramway Co. for an extension of the lease for five years.

**Stockton-on-Tees.**—Proposed Purchase.—The T.C. has decided to co-operate with Thornaby in the purchase of the part of the Middlesbrough, Stockton, and Thornaby tramway undertaking within the borough, and suggests that, in regard to the division of the expenditure and income, the proportions should be: Stockton, three-fourths; and Thornaby, one-fourth.

**Turkey.**—It is stated that Damascus—the oldest city in the world—was the first city in Turkish territory to have electric tramways and lighting.

**Wigan.**—Overcrowded Cars.—No tramway car should be carrying 82 passengers when 46 is the proper number, said the coroner at an inquest on a girl who fell from a workmen's car and was killed.

**York.**—Increase of Fares.—The Tramways Committee recommends that application be made to the B. of T. for powers to advance the tramway fares by 50 per cent.

# TELEGRAPH AND TELEPHONE NOTES.

**Italian Wireless Press.**—An Italian Wireless Agency has been incorporated for the distribution of news to the Oversea Press. Four steamship companies, two banks, and the Ansaldo Co. are among the shareholders of the new corporation, which will start business the moment the war ends and the Government releases the wireless stations.

**Japan.**—Owing to a severe storm, telegraph cables and wires to Japan have been almost completely interrupted, and telegrams from Shanghai take four days to reach Tokio.

**Panama.**—The *Wireless World* records the establishment of a new wireless station at Balboa, at the entrance to the Panama Canal, from which time signals are radiated.

**The Poulsen System.**—According to *The Steamship*, the U.S. Government has paid the Poulsen Wireless Co. £350,000 for the existing wireless plants of the Poulsen Co. in America, and the right to use the Poulsen patents on all Government wireless stations as well as vessels of the U.S. Navy and ships of the Emergency Fleet Corporation. The high-power plants in the Philippine Islands and Sandwich Islands are equipped with the Poulsen apparatus. The 2½-kw. stations, it is said, have a radius of 1,000 to 1,200 miles. The manufacture of these arc sets of small power for ships and local use has now been made possible on a commercial scale. Formerly the commercial production of arc sets was restricted to high-power plants.

**Trunk Telephone Delay.**—The Postmaster-General states that, owing to the great number of naval, military, and other calls of national importance entitled to priority on the telephone trunk lines which are now made from London, it is impossible to estimate with any degree of accuracy the amount of time which will elapse before particular private calls can be effected or to give subscribers any reliable information on the subject.

**United States.**—Mr. Theodore Vail, president of the American Telephone and Telegraph Co., announces the completion of a satisfactory arrangement with the Government for the war-time control of the telegraph and telephone lines. The allowance made by the Government covers fixed charges and dividends at current rates on outstanding stock, or any which may be issued. The allowance, it is expressly stated, is not to be the basis for a valuation of the properties.—*The Times.*

# CONTRACTS OPEN AND CLOSED.

## OPEN.

**Australia.**—Queensland. November 29th. Electric lifts for the Department of Public Works, Brisbane.—*Industrial Australian and Mining Standard.*

**Bedford.**—November 13th. Two water-tube boilers, mechanical stokers, and induced-draught plant for the Corporation. See our advertisement pages October 4th.

**Portsmouth.**—October 15th. Tramways Committee. Six months' supply of stores, including various electrical items. See "Official Notices" September 27th.

**South Africa.**—Johannesburg.—November 27th. Municipal Council. 2,000 copper ribbon bonds, and 2,000 copper solid bonds (Contract No. 424). A copy of the specification can be seen at the Inquiry Office of the Department of Oversea Trade (Development and Intelligence), London.

**Stockton-on-Tees.**—October 12th. Electrician's work at new maternity home. Borough Engineer, Victoria Buildings.

**Warrington.**—October 22nd. Water-tube boiler, for the Electricity Department. See our advertisement pages October 4th.

## CLOSED.

**Australia.**—P.M.G.'s Department, Queensland :—
Telephone material, £67.—Western Electric Co. (Aust.), Ltd.; do. £69.—B. I. & Helsby Cables, Ltd.

Commonwealth Naval Dockyard :—
Two Igranic automatic starting panels for 450/550-b.h.p. motors, £1,322; one do. for 60-b.h.p. motor, £139; two do. for 3-b.h.p. motors, £61; two do. for 7-b.h.p. motors, £68; one set of spares, £37.—Noyes Bros. (Sydney), Ltd.

Melbourne.—Electric Supply Committee :—
Six 200-amp., 6,600-volt switches, £330.—Electric Equipment Manufacturers, Ltd.; 200 10-amp. a.c. meters, £360.—Australian General Electric Co.

Electricity Department :—
1,000 condenser tubes, £712.—John Danks & Sons, Pty., Ltd.

Commonwealth P.M.G.'s Department :—
Automatic telephone material for New South Wales, £636.—Automatic Telephones (Aust.), Ltd.

Victorian Railways Department :—
Electric meters for power signalling.—Warburton Franki, Ltd.

Commonwealth Railways :—
Cells for lighting equipment, Port Augusta, £648.—M. C. Coates.

Victorian State Coal Mine :—
Electric flat irons, 20s. each.—Australian General Electric Co.
—*Tenders.*

**Belfast.**—Electricity Committee :—
Two 6,000-kw. turbo-alternators with condensing plant, &c., and one 300-kw. balancer booster, £74,839.—British Thomson-Houston Co., Ltd.
Four 48,000-lb. water-tube boilers, &c.; four fuel economisers, and two steel chimneys, &c., £82,516.—Stirling Boiler Co., Ltd.
Two electrically-driven boiler feed pumps, £1,565.—Holden & Brook, Ltd.
Accumulators, £4,414.—Tudor Accumulator Co., Ltd.
Rotary converters, £20,613.—Vickers, Ltd.
Static transformers, £9,102.—Siemens Bros., Ltd.
—*Belfast News Letter.*

**Barrow.**—T.C. Contracts placed in connection with electricity extensions :—
Chequerplates and iron work for turbo-alternator foundations.—Babcock and Wilcox, Ltd., £39.
Feed tank.—Frederick Braby & Co., Ltd., £95.
Wrought-iron pipes and fittings.—Messrs. John Spencer, Ltd., £55.
Cable to turbo-alternator.—B.I. & Helsby Cables, Ltd., £91.
Glazed bricks and tiles.—Leeds Fireclay Co., Ltd., £42.
Alterations and additions to e.h.t. switchgear for turbo-alternator.—B.T.H. Co., Ltd.—£474.
Three ironclad e.h.t. switch panels.—Ferranti, Ltd., £460.
Cables for supply to permanent houses.—B. I. & Helsby Cables, Ltd., £1,205.
Meters.—General Electric Co., Ltd., £467.

**Bradford.**—Tramways Committee :—
Dick, Kerr & Co., Ltd.—One pair of special traction motors.
Cole Marchent & Morley, Ltd.—60 tons of brake shoes, at 5 per cent. advance on previous price.
Hadfields, Ltd.—Point fittings, &c., £73.
Clay & Atkinson.—Parts of automatic point controllers, £54.
Electricity Committee :—
Clay Cross Co., Ltd.—Cast-iron water pipes for Nos. 5 and 6 turbo-generators for Valley Road works.
Heenan & Froude, Ltd.—Three wet air filters.
Bertram Thomas.—One auxiliary switchboard for transformer chamber.

**Ilford.**—The U.D.C. has placed an order with the makers of its "Orwell" wagons for an electric tipping gear, at £50.

**Leek.**—U.D.C. Electricity Committee. Twin cylinder gas engine. National Gas Engine Co., Ltd.

**Luton.**—T.C. T. & E. Neville, £4,297. Extension of electricity station buildings.

**South Africa.**—Johannesburg.—T.C. :—
One 500-kw. d.c. generating set, and one 400-kw. do.—Langlaagte Estate and Gold-mining Co., Ltd., £6,000.

Cape Town.—Messrs. Edward A. Shaw & Co. Wiring for electric lighting and bells of "Leeuwenhof," the Cape residence of Mr. Isaac Lewis, of Messrs. Lewis & Marks, Johannesburg, £484.

**Stratford.**—T.C. Electricity and Tramway Departments: Doulton & Co., 750 yd., 3½-in. diam., 4-way Doulton conduits, 7s. 2½d. per yd. net; 450 brown glazed stoneware tile covers, stamped "electricity," 5d. each net.

**Stepney.**—Electricity Committee :—
E. Foster & Co.—10,904 tons of coal, at from 26s. 3d. to 29s. 7d. per ton.
A. Blackman & Co.—2,000 tons of coal, at 28s. 11d. per ton.
Rose, Smith & Co.—250 tons, at 26s.

# FORTHCOMING EVENTS.

**Electro-Harmonic Society.**—Friday, October 11th. At 8 p.m. Smoking Concert. At the Holborn Restaurant, Venetian Chamber.

**Association of Engineers-in-Charge.**—Saturday, October 12th. At 7.30 p.m. At St. Bride's Institute, E.C. Address on "Fuel Economy," by Mr. D. Wilson, Technical Adviser to the Coal Controller of the B. of T.

**Birmingham and District Electric Club.**—Saturday, October 12th. At the Swan Hotel, New Street, Birmingham. At 7 p.m. Paper on "Some Modern Applications of the Gyroscope," by Mr. H. F. Stevenson.

**North of England Institute of Mining and Mechanical Engineers.**—Saturday, October 12th. At 2 p.m. At Neville Hall, Newcastle-on-Tyne. General meeting.

**Manchester Association of Engineers.**—Saturday, October 12th. At 6.30 p.m. At the Grand Hotel. Presentation of the Constantine Medal to Mr. C. A. Edwards, for his paper on "The Hardening and Tempering of Steel," and inaugural address by the President, Mr. J. Butterworth.

**Institution of Electrical Engineers (Western Centre).**—Monday, October 14th. At 7 p.m. At the Merchant Venturers Technical College, Bristol. Address by the Chairman, Mr. H. P. Rogers.

**Junior Institution of Engineers (North-Eastern Section).**—Tuesday, October 15th. At 7.15 p.m. At the Mining Institute, Neville Street, Newcastle-on-Tyne. Discussion on "The Coal Conservation Sub-Committee's Report," to be opened by Mr. M. Ward.

**Electrical Power Engineers' Association (Sheffield and District Section).**—Wednesday, October 16th. At the Royal Victoria Station Hotel, Sheffield. At 6.45 p.m. Address by the President and one of the Vice-Presidents of the Association on "Present Activities and Progress of the Association."

**Industrial Reconstruction Council.**—Wednesday, October 16th. At 4.30 p.m. At the Saddler's Hall, Cheapside, E.C. Address on "Principles of Reconstruction," by the Rt. Hon. Christopher Addison, M.P., Minister of Reconstruction.

**Institution of Mechanical Engineers.**—Friday, October 18th. At 6 p.m. At the Institution of Civil Engineers, Great George Street, S.W. General meeting.

**Corrosion by Earth Currents of Electric Railways.**—The corrosion of gas and water pipes and of the sheaths of cables has given considerable trouble in Switzerland, and on this account a joint committee of the Swiss Gas and Water Institute, the Institute of Swiss Secondary Railways, and the Swiss Electrotechnical Institute was formed to inquire into and report upon the matter. The first report of the committee has now been issued.—*Bulletin, Schweizerischer Elektrotechnicher*, July, 1918.

## AN URGENT APPEAL TO ALL.

We have occasionally appealed to our readers on behalf of certain funds connected with the electrical and allied trades. Such appeals have been responded to heartily when the justice of the appeal has been realised. During the war we have opened our columns to make known the claims of some funds not exclusively electrical—assisting Belgian refugees, our blinded heroes, the orphans of France, and others who have been made the victims of the Prussian monster. We believe that the sufferings of these have gone home to the heart of every son of British Liberty.

To-day we make no apology for bringing before the notice of everybody who reads these lines the pressing need that exists for a full and free flow of generosity for the replenishing of the coffers of an organisation which has no equal throughout the world—the British Red Cross Society.

It is believed that the citadel of Prussian militarism is tottering to its fall, but with the coming of peace there cannot come a termination of Red Cross activity. Everybody has somebody with the fighting Forces to-day—it may fall to the Red Cross organisation to bind up his wounds, to pour in the oil and wine, to save his life, and ultimately restore him to family and home. He may already be in a hospital in Blighty under Red Cross care. Perhaps he is suffering pain and hardship in the slavery that stamps Germany as hell for ever in the mind of the Prisoner of War; the Red Cross—the only angel of mercy that can help in such a case if the Government fail—steps in to furnish food and clothing, warding off starvation and death and ameliorating suffering, maintaining life and brightening it with rays of hope until the day of rapturous freedom. £40,000 a week is expended by the Red Cross on Prisoners of War work alone. This year £1,500,000 has been spent thus. And in scores of other ways this organisation is spending its energies as "The Greatest Mother on Earth."

We have no need to continue the story or to elaborate its details. Everybody must know of the splendid service that it is rendering wherever our men are fighting and suffering on our behalf. It is not a charity in the ordinary sense. It cannot come to any of us as other than a great National Obligation—to most it comes nearer still as a personal one. We make no apology, therefore, in commending it to the most generous sympathies of all our readers who, we trust, will prepare for "Our Day" in the City of London. If the funds are not forthcoming somebody must suffer—perhaps your boy, your brother—between now and the cessation of hostilities, or after the shudders of war have ended, when the streams of generosity may flow less freely. Therefore, between now and October 24th we trust that the electrical trades, not to be outdone by others of the 60 trade and professional sections of this wealthy metropolis who are co-operating in the movement, will do their utmost in response to the Lord Mayor of London's City Appeal. Small sums from the coppers of the office boy, large sums of the order of £10,000, all are required to build up the million pounds that are asked for.

Contributions towards this City Million should be sent to Major Rothschild.

## NOTES.

**Enemy Aliens.**—The American Institute of Mining Engineers has decided to remove the names of all enemy aliens from the roll of membership. This action will affect the position of 21 Germans and one Austrian.

**Aluminium in Germany.**—According to an article in *Nature* on "German Industry and the War," before the war Germany was almost wholly dependent on foreign supplies of aluminium; in 1913 she consumed about 12,500 tons, of which 10,000 tons was imported. The exportation of French bauxite being forbidden, Germany had to find other sources of the material; bauxite deposits were discovered in Hungary and Carniola, and works were established which rendered the Central Powers independent of foreign supplies. The manufacture of aluminium is now an established German industry.

**Institution and Lecture Notes.—Manchester Association of Engineers.**—The following is the syllabus for the 1918-19 session:—

October 12th.—Inaugural address by the president, J. Butterworth.
October 26th.—Paper by A. F. Baillie, "Fuel Oil and its Applications."
November 9th.—Paper by W. F. Rhodes, "Workshop Measurements, with Special Reference to the Limit System."
November 23rd.—Paper by W. H. Atherton, "Conveyors in Relation to Engineering Works."
December 14th.—Paper by J. E. Hurst, "Wood Testing."
January 11th.—Paper by J. Bibby, "Iron and Steel Electric Furnaces."
January 25th.—Topical discussion: "The Past, Present, and Future of Electricity Supply." Introduced by S. L. Pearce and J. A. Robertson.
February 8th.—Paper by G. H. Hey, "Principles in Jig and Tool Design."
February 22nd.—Paper by Prof. C. A. Edwards, "Hardness Determination of Metals."
March 8th.—Paper by H. E. Thomas, "Automatic Machines."
March 22nd.—Annual meeting. Paper by B. Taylor, "Development of Reinforced Concrete."

**Institution of Electrical Engineers.**—The Committee of the Western Centre has issued its report for the session 1917-18. Owing to war conditions, it was considered advisable to restrict the programme to two meetings. The membership now stands at 276, an increase of 13.

The first ordinary meeting of the session will be held at Bristol on Monday next, October 14th, when the chairman, Mr. H. I. Rogers, will deliver his inaugural address. Other arrangements for the session are as follows:—

November 11th.—Cardiff. President's address.
March 31st.—Bristol. Annual meeting.

**Textile Institute.**—At the ninth annual congress of the Textile Institute, held at Bradford on Friday last, Prof. Charnock, of the Fuel and Metallurgy Department of the Bradford Technical College, lectured on "Economic Power Production," and made reference to the advent of electrical transmission as contrasted with the use of steam. He emphasised the urgency of economy in fuel consumption as a general principle, irrespective of the immediate war-time need, and showed the huge wastage of heat value involved in the processes of converting heat into work. The proposal to establish combined electricity and heat generating stations was not new, he said, but it deserved far more attention than it had yet received. It was reasonable to assume that a considerable gain would be obtained by centralisation and working on a large scale. Better methods of domestic heating were greatly needed, and the abolition of the smoke nuisance urgently demanded attention. The reports on "Electric Power Supply" involved a scheme which many people regarded as highly Utopian, but he suggested that if it could be shown to be possible of realisation in its main elements, the issues involved were of such supreme importance to the whole nation, that it should receive the sanction and support of the entire community. The question should be carefully considered and discussed by every technical society in the country, so that when any action dealing with the subject was proposed in Parliament, public opinion might make itself felt in no unmistakable manner. It should always be borne in mind that the main object was the utilisation of the fuel supplies to the best all-round advantage.

Dr. Crowley said that all who investigated the matter were agreed that the existing parochial system of local generation and supply was hopeless, and the only proper method, on technical grounds, was by way of large centralised stations dealing with the whole of an area in a comprehensive manner. The point aimed at was to provide a cheap supply of electricity for as many as possible, and not necessarily to produce a cheap supply at any particular point.

At another stage of the congress Mr. J. W. Sanderson, M.A., headmaster of Oundle School, speaking on "Science and Educational Reconstruction," urged that each big school should be equipped with complete chemical, engineering, and biological laboratories and workshops, and the pupils should gain familiarity, before leaving school, with electrical appliances and units. This applied to both the public and the elementary schools.

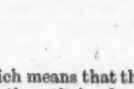
**Electrical Power Engineers' Association.**—A smoking concert in connection with the Midland Division will be held at the Imperial Hotel, Temple Street, Birmingham, on Wednesday, the 16th inst., the chair to be taken at 7.30 p.m. All engineers interested will be cordially welcomed. The membership of this Division is still increasing rapidly, new members having been admitted during the past few months at the rate of about one per day.

At a meeting of the Railway Club, on Tuesday last, Mr. E. W. C. Kearney described his proposed system of tube railways, which, operating on the switchback principle, would enable a speed of 60 miles an hour to be attained and save 85 per cent. of the energy now expended in the motors and brakes.

**New Industrial Works in Canada.**—The *Times* Toronto correspondent reports that 20 industrial concerns are planning new factories at Montreal.

**Leakage Current Detector.**—The Siemens-Schuckert Works has patented a device for detecting leakage currents in the earth. According to *E.T.Z.* of July 25th, the device consists of two metal plates that are strapped under the boots of the observer and are connected to a battery and switching arrangement carried on a waistbelt and connected to a head telephone receiver. When the observer walks about in the neighbourhood where earth currents are flowing he is able to detect them at distances from 10 to 20 metres from the poles carrying the conductors. The direction of flow of the current is determined by the fact that the telephone becomes silent when the observer's feet are at right angles to the direction of the flow of the current, and gives the loudest indications when the feet are in the direction of the flow of the current. The circuits are able to carry 30 amperes continuously and 40 amperes for short times.

**Nomenclature for Electric Ship Welding.**—Under the auspices of the Electric Welding Branch of the Education and Training Section of the U.S. Shipping Board, Emergency Fleet Corporation, a series of discussions has been held by the Engineers' Club of Philadelphia. The first of these relates to the nomenclature of the art, and is reported in the September issue of the *Journal* of the Engineers' Club. An instruction chart has been drawn up, covering the various types of weld, the material employed, &c., and providing a standard symbol for each item; thus a strap joint is denoted by a small circle, a butt joint by a square, a lap joint by an equilateral triangle, and a fillet by the latter inverted. Similarly, the design of the weld, such as single or double V or bevel, its position, the kind of weld—tack weld, caulking weld, &c.—and the finish of the weld, are all furnished with symbols, so that it is possible to specify all the particulars necessary to guide the welding operator by means of a group of hieroglyphics such as the following:—




which means that the edges of two plates are vertically (V) butted (□) together, their edges being prepared with a double V (×), and that the joint is to be a "strength weld" (8) with at least three (3) layers of welding material applied from each side, and furnished with a reinforced or convex (⌒) surface, thereby making the thickness of the weld greater than that of the plates.

With the aid of this code, which has been found indispensable, a drawing can be quickly prepared for the welder, the full instructions for each joint taking up a trifling amount of space compared with that necessary to accommodate a written specification.

In the same issue of the *Journal* is printed the second lecture on "Electric Welding," describing the various methods of welding, and the tools employed. It is interesting to note that spot-welding has been found capable of joining in one operation as many as three 1-in. plates; but the extent to which the process can be commercially applied in shipbuilding has not yet been determined. Views are given of the equipment of a school for arc welding operators, established by the Emergency Fleet Corporation.

**Vickers's Peace Preparations.**—In the course of his speech at the adjourned annual meeting of Vickers, Ltd., on Tuesday last, Mr. Douglas Vickers, the new chairman, said that his references to the company's Peace proposals at the last meeting had been widely circulated (see Elec. Rev., May 10th, 1918, p. 433). They had actually received suggestions from the United States as to the best way to develop their peace resources. The company expected to get a very largely increased output of ships, railway materials, motor-cars, turbines, electrical materials, gas engines, wood products, sewing machines, and electrical work generally. Their type of sewing machine had been reported upon very satisfactorily, but in the case of developing a business of that character a great deal more capital was required in order to carry the heavy stocks which had to be held at the works and showroom. If the Government ordered a gun from them they sometimes got a deposit with it. But if anybody wanted to buy a sewing machine they did not order it from the manufacturer; they wanted to buy it at once out of stock. In addition they would have to go a good deal further afield in the search for work in the nature of electrical and railway material. And in going further afield they would get into one where the conditions of payment were not quite what they had been accustomed to in this country. Quite probably they would have to do a good deal more in financing undertakings, and they might have to join with banks in doing so, out of which they hoped not only to get a return on the work done, but also a return upon their financing arrangements. The Germans had made a good deal of that form of trade, and it was to be hoped that we should not leave the field to them in the future.

**The V.D.E.**—The Verband Deutscher Elektrotechniker recently celebrated in Berlin the 25th anniversary of its foundation.

**Comparison of Capacities.**—In a note from the Westinghouse Research Laboratory by Dr. P. Thomas, published in the *Journal* of the Franklin Institute for September, a novel method of comparing two capacities is described, for which the author claims an exceptional degree of accuracy and convenience. The principle is that of discharging two condensers—one of known capacity, the other to be measured—through a galvanometer in rapid succession and in opposite directions, and adjusting the voltages on the capacities until balance is indicated by zero deflection of the galvanometer. To effect the necessary changes of connections a simple rotating commutator is used, and the voltages are adjusted by taking them off a potentiometer resistance, through which current flows from a battery. When balance obtains, $C_1 R_1 = C_2 R_2$; a correction for the capacity of the leads is easily determined. The method, says the author, is very easy to use, and its sensitiveness is limited only by the current sensitivity of the galvanometer. Neither voltage nor speed enters into the equation giving the result.

**Protest against Employment of Unskilled Electrical Men at Melbourne.**—Representatives of the Electrical Trades Association waited on the Minister of Railways in July to protest against the employment in the department on electrical work of men who had only received a few weeks' training. It was pointed out that this work could only be efficiently done by skilled electricians, and cases had occurred in which the work of the unskilled man had been condemned and had to be done over again. It was asked that the policy of the Government should be that only skilled tradesmen should be employed. Mr. Barnes said that as far as he was personally concerned, he would not like to see this practice encouraged. He believed it was best in the long run to employ the skilled artisan. He promised to inquire into the matter and discover to what extent the practice prevailed. Either there was very little to learn in electrical work or that done in the department was inefficient.—*Melbourne Age.*

**Electric Pig-Iron in British Columbia.**—Pig-iron is now being cast from electrically-operated furnaces in several parts of British Columbia, and the experiment has proved a great success. One firm with electric furnaces has received orders amounting to 2,000 tons of pig-iron, a large proportion of which is intended for Japan.

**A New Canal in France.**—Particulars are given in *Le Génie Civil* of a project for the construction of a canal giving direct communication between Paris and the sea at Dieppe. The idea was first mooted by Vauban in 1694, and has many times been revived; it is regarded as of present importance in view of after-war conditions. The Seine does not suffice to deal with the traffic, and there have been as many as 70 ships in the estuary awaiting their turn to enter Rouen, besides 1,300 barges awaiting their turn to leave.

The canal is designed to accommodate the largest boats at present traversing the French waterways, which carry 1,400 tons and are 88 m. in length, with a draught of 3 m. when loaded. The barges are to be hauled by electric locomotives running on a track alongside of the canal, or on a roadway. The canal would be 165 km. in length, as compared with the route by the devious River Seine, which is no less than 350 km. long (Paris to Havre).

**Appointments Vacant.**—Distribution engineer (£280) for the St. Helens Corporation electric supply department; shift engineer for the Stretford U.D.C. electricity works; shift engineer (60s. to 75s.) for the Eccles Corporation electricity works; charge engineer (85s.) for the South Shields Corporation electricity department; a professor of physics (£800) is required for the University of Cape Town, also a lecturer for the Department of Physics at the South African School of Mines and Technology at Johannesburg (£450). See our advertisement pages to-day.

**Electrical Phenomena Illustrated in a New Manner.**—According to the *Electrical Review*, Chicago, motion-picture films are recommended by Charles F. Bishop, of Rochester, N.Y., for the purpose of illustrating such phenomena as are inherently invisible in character, or otherwise difficult to demonstrate in actual visible form. Where electric circuits are involved, he uses parallel lines for representing each conductor, and partly fills in the space between these lines when he wants to picture the flow of current. Likewise he uses parallel lines of varying density to indicate different degrees of magnetisation.

For example, in our illustration (taken from U.S. Patent

Fig. 1.

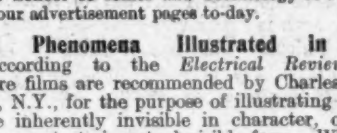


Fig. 2.

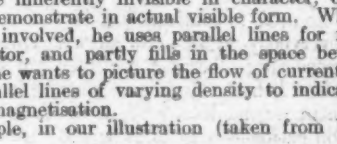
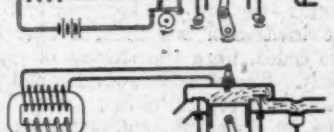


Fig. 3.

Fig. 4.



1,270,369, which was assigned by Mr. Bishop to the North-east Electric Co., of Rochester, N.Y.) fig. 1 shows the ignition circuit of an internal-combustion engine as it appears when the engine is exhausting, and fig. 2 shows the circuit to be equally inoperative during the intake of the engine. Fig. 3 shows the gaseous charge of the engine as compressed and the battery circuit closed through the transformer forming part of the ignition apparatus, thus magnetising the core of the transformer. Finally, fig. 4 shows the secondary circuit as discharging at the spark plug, while the magnetisation of the transformer core is diminishing. In practice, intermediate views could be shown, so as to illustrate the gradual transition.

**Volunteer Notes.**—London Army Troops Companies, Royal Engineers.—Headquarters: Balderton Street, Oxford Street, W. 1.

Corps Orders No. 42, by Lieut.-Colonel C. B. Clay, V.D., Commanding.
*Captain of the Week.*—Capt. W. Darley Bentley.
*Next for Duty.*—Capt. E. G. Fleming.
Sunday, October 13th.—Commandant's Parade, at Waterloo Station, 8.45 a.m., for work, "Pontooning," at Esher. Drill order. Greatcoats to be worn. Mid-day and tea rations to be carried.
Monday, October 14th to Friday, October 18th.—Drills as usual.
Sunday, October 20th.—Annual Musketry course at Pirbright. Parade at Waterloo Station, 8.45 a.m. Drill order, with pouches, rifles, and side arms. Mid-day and tea rations to be carried.

C. Higgins, *Capt.* R.E., *Adjutant.*

**Ramsay Memorial Fund.**—The Prince of Wales has accepted the position of patron of the Ramsay Memorial Fund, founded in November, 1916, to raise £100,000 as a memorial to the late Sir William Ramsay. The Committee has already raised £37,000, and subscriptions from oversea Committees will probably bring the total to £50,000. It is proposed to raise the remaining £50,000 by a million-shilling fund, now opened with a donation of 1,000 shillings from the Prince of Wales. Donations from 1s. upwards should be sent to the hon. treasurer, Lord Glenconner, at University College, London, W.C. 1.

**Fuel Economy.**—The following letters arrived too late for inclusion in our "Correspondence" columns:—

"I am pleased to note that you have published on page 328 of your issue of October 4th the order and programme announced officially by the United States Fuel Administrator for the standardisation of lamps and the elimination of carbon lamps in the interests of conservation of coal in the United States.

"It would be very desirable for the Board of Trade and the Fuel Controller to issue a similar order for Great Britain. Great Britain uses proportionately a greater number of carbon lamps than the United States does, and, therefore, the proportionate fuel economy to be secured by the elimination of carbon lamps in Great Britain makes such a programme even more important here than in the United States, where for a number of years past, special endeavours have been made to replace the inefficient carbon lamp by the more efficient metal-filament for ordinary economic reasons.

"Some such intelligent programme as this one announced in the United States would be certainly very desirable for the English authorities to announce in place of their present very general and rather crude request to turn out every possible light. Such general programmes are inefficient as compared with a definite, well-considered programme such as the United States authorities have put forward.

"Representing by 100 the consumption of carbon lamps, the saving to be gained by abandoning carbon and substituting metal-filament lamps of equal candle-power, therefore, runs from 65 per cent. to 75 per cent., as compared to a saving of about 35 per cent. to 25 per cent. by turning out metal-filament lamps on the English authorities' programme.

"It should be realised, of course, that the total economy in coal consumption with electric lighting is extremely small. If all the electric lighting in the country were turned off, and no more electric lights permitted, the total coal saving for Great Britain would not exceed 1½ per cent. to 2 per cent.

"As it is impossible to turn off all the electric lighting, and some light must necessarily be used, it is important that such a programme as the United States authorities have laid down should be put forward by the English authorities as well, and it is sincerely hoped that such a step will be taken. This programme goes directly to the root of the matter in pointing out that carbon-filament lamps are wasteful, and should be replaced by the more efficient metal-filament lamps, effecting a gain by such replacement for the same candle-power of 65 per cent. to 75 per cent. in one step.

"Where large candle-power lamps can be used, the substitution of the gas-filled or half-watt type lamps for the ordinary metal or other types of lamps, will effect still further gains, running all the way from 50 per cent. to 80 per cent. or 90 per cent.

"October 9th, 1918. "Atlantic."

"As a careful reader of the Electrical Review, may I be permitted the following commentary on the above subject, as dealt with by Mr. Ed. C. de Segundo in your issues of September 27th and October 4th?

"Considered merely from the point of view of domestic heating, the figures, as presented by Mr. de Segundo, would appear to indicate that, on a cost and efficiency basis, the coal ration, as compared with the 'equivalent' in gas, anthracite, coke, and electricity allowed under the Order, is the best and cheapest medium for heating. This, unfortunately, will be the conclusion arrived at by the majority of householders who have individually been given the opportunity to choose either the manufactured or raw material without, apparently, adequate guidance as to the bearing of their decision upon the question of national efficiency and economy.

"The determination of the 'equivalents' as allowed in Clause 7 of the Household Fuel and Lighting Order was, no doubt, arrived at in the light of a full knowledge of all the more salient factors—labour, transport, military, and political—but, in view of the relatively low gas and coke equivalents allowed, it is difficult to believe that the important bearing of this question upon the problems of adequate food production, the supply of fuel oils for the Navy, 'raw' materials for explosives and industry, and the repair of our highways, received adequate consideration. Had due consideration been given to these factors, it is incomprehensible that gas and coke, except for the purpose of enforcing due economy, should have been rationed at all.

"Allowing for a moderate coal consumption per unit delivered (5·5 lb.), Mr. de Segundo shows that in allowing 800 B.O.T. units of electricity to count as one ton of fuel, the Controller of Coal Mines has to provide the electricity supply works with two tons of coal, which, in the process of conversion, is completely destroyed. Assuming a steam consumption of 33 lb. per unit delivered (an unusually high figure), an average evaporation of only 6 lb. of steam per lb. of coal would, therefore, appear to be obtained from average quality coal used at electricity works.

"Now, in addition to the gas recovered from one ton of coal delivered to a gas works (about 12,000 cb. ft.), there remain the following secondary products:—10 to 11 cwt. of coke, 2 cwt. of breeze, 12 gallons of coal tar, as well as 24 lb. of sulphate of ammonia, of which 1,400,000 tons are required annually in order to ensure the adequacy of the world's harvests.

"Considered as steam-raising fuel, the net evaporative value of the combustible secondary products compared with that of average quality coal slack is as follows:—

| | Net evapprative value per lb. | Total evaporation. |
|---|---|---|
| 11 cwt. coke ... ... | 9·8 lb. | 11,093 |
| 2 cwt. breeze ... ... | 6·0 lb. | 1,344 |
| 12 gal. coal tar ... ... | 14·0 lb. | 1,558 |
| | | 13,995 |
| 1 ton of coal slack ... | 6·0 lb. | 13,440 |

"It will be seen, therefore, that the combustible secondary products of a ton of coal carbonised at a gas works are approximately equivalent in net evaporative value to a ton of coal slack of average quality as consumed at electricity supply stations. In this connection the announcement on page 300 of the Electrical Review to the effect that arrangements have been made for the supply of 1,000 tons of coke per week to an important London power station is particularly interesting. Electricity generated from gas coke, or a blend of gas coke and coal slack of a kind useless for any other than fuel purposes, is a commodity quite different, from the standpoint of national advantage, to that generated by the complete destruction of coal capable of profitable treatment, as it largely is, either in coke ovens or gas retorts. The consumption of coal cannot at the present time be considered merely as a question of so many tons less or more, within limits, being consumed. The stern necessities of the present times demand that the greatest possible proportion of the coal used should be so consumed that its by-products may be available as carbonaceous solid fuel and as the bases of high explosives, fuel oil, and of artificial manures. It is hardly needful to point out that these are only obtainable by the carbonisation of coal, either in gasworks or coke ovens.

"E. W. L. Nicol,
"*Engineer and Fuel Expert,*
"October 9th, 1918. "*London Coke Committee.*"

**British Oil.**—The *Pall Mall Gazette* states that Lord Hartington will "open" on October 13th the first oil well sunk in the Chesterfield district. It is on the Duke of Devonshire's estate near Hardwick Hall.

**An Instrument for Measuring Heat Losses at the Chimney.**—An instrument proposed by M. Marcel Chapin records simultaneously the value of temperature and carbonic acid gas content of the smoke and the resultant loss at the chimney. If P is the percentage loss of calorific power of the fuel and $T_1$ and $T_2$ are respectively the temperature of the air when entering the grate and of the smoke when passing the receiver of the apparatus; further, if A is the quantity of $CO_2$ in the smoke, these factors are connected by the relation $P = K \times (T_2 - T_1)/A$, K being a coefficient of proportionality. In the apparatus proposed, the temperature and percentage of $CO_2$ are represented by two electric currents, of which the strength depends on these variables, the chimney loss being obtained by dividing the value of these currents as in the equation. The electrical equivalent of the $CO_2$ content is arrived at as follows:—When a constant volume of the gas to be analysed is mixed in a constant volume of a titrated solution of caustic soda, a mixture of soda and carbonate of soda results, the relative proportions of which depend on the $CO_2$ content. The electrical resistivity of a carbonate of soda solution is three times as great as that of the caustic soda solution from which it is derived. It is only necessary then to compare the electric resistance of the solution before and after absorption of the $CO_2$ in order to arrive at the percentage of this gas in the sample examined. The apparatus comprises a pyrometer and a moving-coil ammeter giving the percentage of $CO_2$. The quotient of the two currents is obtained by referring the overlap of the two pointers to curves of equal loss at the chimney. A receiver is used for (1) measuring a constant volume of soda taken from a glass vessel; (2) mixing the $CO_2$ and the soda; (3) forming a resistance-column of solution between two electrodes forming part of the measuring circuit. Tests made with the instrument show that the method is sufficiently accurate for industrial purposes.—*Comptes rendus de l'Académie des Sciences*, August 26th.

**The Imatra Waterfalls.**—It is reported that the question of the utilisation of the Imatra waterfalls, which in pre-war times were proposed, partly under Belgian auspices, to be used in connection with the transmission of power to Petrograd, has been resumed by the presentation to the Finnish Government of an application for a concession. The expenditure was estimated formerly at from £1,250,000 to £1,500,000; at present the computations are three or four times greater. The most favourable fall amounts to 21 metres, and it is calculated that the power available is 118,000 H.P. It is proposed to use the power for the establishment of a national nitrogen and fertilising industry. A provisional scheme has also been brought forward for the utilisation of the water power of the Vuoksen.

**Control of Coke.**—From October 7th the price of gas coke for household and industrial purposes has been controlled throughout England, Wales, and Scotland by a new order of the Board of Trade. Hitherto, in the Metropolitan area there was an agreed price with the gas companies, and in other parts of the country, although recognised prices prevailed, there was nothing to prevent gas companies or any other dealer charging higher prices. The effect of the order is that the price of gas coke shall not exceed in any district the price of the second list of house coal. Industries which use gas coke to the extent of 50 tons per month on a yearly contract will obtain a discount of 10 per cent. The maximum price of unscreened coke breeze will be 60 per cent. cheaper than that of ordinary large coke. Industrial users of over 600 tons a year will again have a 10 per cent. discount. The prices of second list coal, on which the prices of coke are based, are fixed by the Local Coal Committees in each district.

**"Labour and Capital."**—The reader has become so accustomed to see the title of this note differently rendered that he may think the printer has fallen into error, but such is not the case. It is the order adopted by Mr. H. Tipper for the title of an address delivered to an American society of engineers in May last. We hardly think we should go far enough if we termed it prophecy. The two parties are really interdependent, but unfortunately men do not always see it so. In the nature of things under the present economic system Capital precedes and prepares the opportunity for Labour, but Labour provides for the return on and the security of Capital. Differences are arising practically every day due to actual or suspected unfair division of the spoils. As we mentioned last week, industrial profit-sharing has received the authoritative sanction of the Italian Government, and no doubt the principle will be approved in other countries as well, as one step toward dealing with industrial revolutions. From Mr. Tipper's address we learn that matters are undergoing somewhat similar developments across the Atlantic.

He says:—"So long as the profits of industry and the profits of labour are the only ideals of industry on the one hand and labour on the other, so long must the question of difference be solved by strife only; for, unless we displace the ideal of the present with the ideal which can be used in the future for better purposes; unless we get into our work the spirit of accomplishment on both sides, instead of the spirit of profits, we shall continue until we get into either a labour or an industrial autocracy. And as this has been brought nearer it is evident that the labour problems have been met during the war. Mr. Schwab himself said, not long ago, something which a few years ago would have been stamped as the rankest socialism, when he said that the worker would rule before very long. The Standard Oil Co., one of the most autocratic concerns in this country, but at the same time one of the most intelligent, began the other day an experiment in democracy in industry. It was arranged that representatives of the workers should sit with the board of directors to consider wages, factory conditions, and other essentialities of the working man."

**American Railway Electrification.**—The *Financial Times* states that Mr. W. G. McAdoo, Director-General of Railroads in the United States, has made an important statement to the New York *Times* respecting the future of American railway systems. As we stated in our issue of September 13th, he is in favour of general electrification, and conceives it possible that the country may have to resort to conversion even while the war is on. The following extracts give his principal views:—

If the Government were to continue the administration of the railroads of the country for any prolonged period he would be in favour of resorting to the use of electricity.

Notwithstanding the great development throughout the country of water powers, there remained tremendous sources of power yet to be harnessed. This power, now almost entirely the property of the United States, could be commandeered at a cost slight in comparison with the advantages to be derived from it.

The secretary suggested that probably electrification would be actually undertaken while the Government had control of the railroads, and that the problem would be attacked at the most favourable points in the country where the static value of water was most obvious and the cost of making the change from steam to electricity would be comparatively small.

## OUR PERSONAL COLUMN.

***The Editors invite electrical engineers, whether connected with the technical or the commercial side of the profession and industry, also electric tramway and railway officials, to keep readers of the* ELECTRICAL REVIEW *posted as to their movements.***

**Central Station Officials.**—Tonbridge U.D.C. has increased the salary of the electrical engineer, Mr. PLUNKETT, by £25 a year to £400.

Mr. C. V. BENNETT, for 19 years manager of the Herne Bay Gas & Electricity Co., Ltd., who has retired, has been presented by the staff with a silver cake basket. He will be succeeded by Mr. D. H. Davies, of Nantwich.

Mr. F. J. SIMPSON, engineer and general manager of Preston Corporation Tramways, is one of four selected candidates for a similar position at Bradford, at £800 per annum.

Mr. G. W. STUBBINGS has been appointed assistant mains superintendent at the Croydon Corporation Electricity Works.

**General.**—Prof. W. E. DALBY, F.R.S., has consented to serve on the Expert Sub-Committee of the Gas Traction Committee in the place of the late Colonel Bertram Hopkinson, F.R.S.

Mr. J. W. PLACKETT, who recently retired from the postmastership of Bradford, has undertaken, at the request of the Postmaster-General, special war work in the telephone and telegraphic traffic sections of the secretary's office at the General Post Office, London.

At Blackpool, last week, Sergt. L. C. SPEED, A.S.C., electrical engineer, was married to Miss Dorothy Bateson, daughter of Mr. Wm. Bateson, borough treasurer, of Blackpool.

At the Savoy Hotel, London, last week, Mr. A. RICHARDSON, M.P. (of *Engineering*), was entertained to dinner by a distinguished company of engineers to commemorate his election as M.P. for Gravesend. Those present included:—Sir Alfred Yarrow, Bart., who presided, Mr. G. N. Barnes, M.P., Mr. John Hodge, M.P., Sir William Beardmore, Bart., Sir Charles Parsons, K.C.B., Mr. W. H. Allen, D.L., Sir G. Carter, K.B.E., Mr. W. H. Maw, LL.D., Past President, Institution of Mechanical Engineers, Sir John Hunter, K.B.E., Ministry of Munitions, Sir Herbert Rowell, K.B.E., Mr. A. T. Hollingsworth, Sir John E. Thornycroft, K.B.E., Col. J. M. Denny, Committee of Production, Mr. Andrew Laing, C.B.E., Mr. A. B. Gowan, of Jarrow, Mr. G. Mure Ritchie, London, Mr. D. B. Morison, and Mr. R. W. Allen, C.B.E.

**Roll of Honour.**—Sergeant H. MARTIN, Manchester Regiment, killed in action, was employed by the British Westinghouse Co., Ltd., Trafford Park.

Private E. R. MARKHAM, Manchester Regiment, killed, was employed by Messrs. Charles Macintosh & Co., Ltd., Hulme, Manchester.

Private H. J. SMITH, County of London Regiment, and of the County of London Electric Supply Co., Ltd., secretarial department, was killed in action on August 22nd at the age of only 18 years and 7 months. He had volunteered to go to the Front immediately, and was killed within a week or so of reaching the firing line.

Sergeant Herbert H. WOOD, aged 21, who died of fever at Basra, Mesopotamia, in September, was a draughtsman with Messrs. Bertram Thomas, Hulme, Manchester. He volunteered with Commander Locker Lampson's Armoured Car Unit, Dunster Force. Sergt. Wood was the eldest son of Mr. H. A. Wood, electrical engineer, Lancashire County Asylum, Prestwich.

Major L. P. AIZLEWOOD, R.A.F., who has been killed, was trained as an electrical and mechanical engineer at the Parkgate Iron and Steel Works, Sheffield. He joined the R.A.F. in January, 1917, and for his services on the Western Front had been awarded the Military Cross.

Able Seaman W. A. TAYLOR, R.N. Division, who has been seriously wounded, was an electrician for Mr. C. V. Fisher, Doncaster.

Sapper A. G. HONEYBONE, R.E., whose death in action occurred on September 26th, was in the electrical department at the Bentley Collieries, near Doncaster.

Private R. S. WEBSTER, Cheshire Regiment, killed in action, was formerly employed by the B.I. and Helsby Cables, Ltd., Helsby.

Ordinary Seaman A. BOARDMAN, R.N., who has died of pneumonia in hospital at the Crystal Palace, joined the Navy in August last, before which he was on the clerical staff of the St. Helens Cable & Rubber Co., Ltd.

Private W. LOWE, South Lancashire Regiment, killed, was employed by the St. Helens Cable & Rubber Co., Ltd.

Private J. THREADER, Cornwall Regiment, killed, was employed by Messrs. C. Macintosh & Co., Ltd., electric wire and cable manufacturers.

Second Lieutenant A. HINDER, aged 22, R.A.F. (Independent Force), who was killed whilst flying on Septemebr 6th, was employed by the Electric Ordnance & Accessories, Ltd. His machine crashed on landing after returning from a raid.

Pioneer W. BOYDEN, Special Brigade, R.E., formerly on the Stamford staff of the Urban Electric Supply Co., has been wounded.

The Military Cross and two bars awarded to the late Flight-Commander L. MONTEAGLE-BARTON, R.A.F., who destroyed 17 German machines, have been presented by the King to his father, Mr. Leonard Barton, M.I.E.E., of Wallington.

Private R. W. BLICK, Norfolk Regiment, who enlisted from the staff of the Premier Accumulator Co., has fallen in action.

Lance-Corporal T. G. SMALE, Somerset Light Infantry, who was formerly with the Bath Electric Tramways Co., has been repatriated after being a prisoner of war in Germany since August 27th, 1914.

Lance-Corporal L. C. SUGGARS, 8th London Regiment, who is a prisoner of war at Limburg, Germany, was an assistant draughtsman with Messrs. Crompton & Co., Ltd. Towards the end of 1917 he won the Military Medal, and correspondence now received by his parents (not from himself) show

that under circumstances of exceptional danger he saved the life of a paralysed corporal by carrying him under heavy fire to a place 1,000 yards behind the front line. After seeing him safely on a stretcher he went straight back to carry on. The corporal's letter says: "Men have won V.C.'s for a third of what he did that day."

Lieutenant G. Atkinson, Durham Light Infantry, who died of wounds on October 4th, aged 35 years, was, according to the *Times*, for two years with the Tyneside Electrical Development Co. as an accountant.

**Obituary.**—Mr. W. C. May.—Mr. W. C. May, chief traffic manager and acting general manager of the Great Eastern Railway, passed away on Monday, aged 49.

**Will.**—Mr. A. T. Keen, chairman of Messrs. Guest, Keen, and Nettlefolds, Ltd., left £71,861.

## NEW COMPANIES REGISTERED.

**M.P. Manufacturing Co., Ltd.** (151,551).—Private company. Registered September 28th. Capital, £1,000 in £1 shares. Electrical, gas, and mechanical engineers, manufacturers of primary batteries, &c. The subscribers (each with one share) are: M. Darsley, 104, Chandos Road, E. (15), audit clerk; O. C. Snelling, 1, North Street, S.W. (10), junior clerk. First directors: J. W. Manley and B. W. Peteers. Registered office: Twyford Hall, Twyford Street, N.

**W. G. Ayers & Co., Ltd.** (151,564).—Private company. Registered October 1st. Capital, £1,000 in £1 shares. To carry on the business of automobile and electrical engineers, dealers in all kinds of electrical fittings, wholesale and retail dealers in appliances and goods, &c. The subscribers are: W. G. Ayres, 4, Priory Terrace, St. George Street, Northampton, merchant, 97 shares; W. F. Ashley, 1, Datchet Place, Datchet, Bucks, engineer, 3 shares. The first directors are: W. G. Ayres and W. F. Ashley. Registered office: 54, Gracechurch Street, E.C. 3.

## OFFICIAL RETURNS OF ELECTRICAL COMPANIES.

**Eastern General Welding and Brazing Works, Ltd.**—Debenture dated September 19th, 1918, to secure £300 charged on the company's undertaking and property, present and future, including uncalled capital. Holder: W. E. Shepperd.

**Liverpool Galvanising Co., Ltd.**—Debenture dated September 24th, 1918, charged on the company's undertaking and property, present and future, including uncalled capital, securing £200. Holder: Mark Shaffer, 199, Hornby Road, Blackpool.

**British Mannesman Tube Co., Ltd.**—Issued on September 24th, 1918, of £50,000 debentures, part of a series.

## CITY NOTES.

**Vickers, Ltd.**—In their recently-issued report the directors say:—

After four years of war the company now finds itself with an enormously increased plant largely suitable for war material only, and very extensive workshops. Your directors have a peace programme under the most careful consideration, and have made extensive preparations. It is clear, however, that much expenditure will have to be incurred in the replacement of machines suitable for war purposes only, and in carrying the higher proportion of stocks and work in progress that peace trades require.

The extensive connections that have been formed both by the parent company and by the subsidiary companies will be of the greatest use in increasing the company's old peace trades, and in disposing of their new products. In view of these, and possible further combinations, the directors have every confidence in asking the shareholders for their consent to a further increase of the company's capital in ordinary shares to the round figure of £12,000,000.

It is proposed, subject to Treasury consent being obtained, to issue 1,850,000 new shares at 30s., offering these to the present shareholders at the rate of one share for every three now held. When this issue is taken up, it is the intention of the directors to give the necessary notice and to pay off the 5 per cent. third mortgage debentures.

We quote from Mr. Douglas Vickers's speech at the meeting in our "Notes."

**Prospectus.**—*Newcastle-upon-Tyne Electric Supply Co., Ltd.*—The list of applications closed on Tuesday evening (far earlier than was intended), in an issue of 500,000 ordinary shares of £1 each at 20s. 6d. per share. The proceeds will be used to meet expenditure in respect of extensions to generating stations and to the system generally (part of which has already been met by temporary loans from bankers), and for prospective developments and other purposes.

*Callender's Cable and Construction Co., Ltd.*—According to the financial Press, it is proposed to increase the capital of this company owing to the needs following increased business and the higher cost of raw material and labour. It is intended early in November to offer 40,000 £5 cumulative preference shares and 10,000 £5 ordinary shares (£250,000 in all). The rate of preference interest will be 6½ per cent., and that on the present preference shares will be increased to the same rate. The ordinary shares will be issued at £2 premium.

**Electric Supply Corporation, Ltd.**—Presiding at the annual meeting on October 4th, Mr. J. G. B. Stone said that the restrictions had curtailed their private lighting, which in the small towns was their most lucrative business, but in power supply and other ways they had found an outlet. The Ministry of Munitions had issued a letter approving of the suggestion that they should receive increased payment from consumers who were receiving a supply from them under contracts made before the war, but containing no provision for increased prices. The Ministry's views were not readily accepted by the Admiralty for which some of their largest consumers were working. The Statutory Undertakings (Temporary Increase of Charges) Act, 1918, did not permit of increase in rates unless the dividend of the company was reduced 25 per cent. They had now to go into the whole matter afresh, and he did not think it likely that they would get any increase authorised before the end of the current year. Considering the great advance in wages and coal this was a great hardship. The report was adopted.

**Rees Roturbo Manufacturing Co., Ltd.**—Dividend of 10 5/6 per cent. (2s. 2d. per share), less income-tax, on the preference shares on account of arrears to December 31st, 1911. £18,000 has been placed to depreciation reserve, and £25,000 to general reserve, carrying forward £17,143.—*Financier.*

**Stock Exchange Notice.**—The undermentioned have been ordered to be quoted in the Official List:—Stewarts and Lloyds, Ltd.—850,000 deferred shares of £1 each, fully paid (Nos. 1 to 850,000).

**Cape Town Consolidated Tramways and Land Co., Ltd.**—For 1917 there is a debit balance of £540, as against £631 for 1916. The subsidiary companies have not declared dividends.

**Direct United States Cable Co., Ltd.**—Interim dividend 2s. per share, less tax, making 4 per cent. per annum for the half year.

**Brisbane Electric Tramways Investment Co., Ltd.**—Interim dividend of 4s. per share, free of tax, on the ordinary shares.

**Bell Telephone Co. of Canada, Ltd.**—Dividend 2 per cent., less tax.

**Cuba Submarine Telegraph Co., Ltd.**—Interim dividend 5 per cent. per annum, free of tax, on the ordinary shares.

**Lima Light, Power and Tramways, Ltd.**—Dividend 1½ per cent.

## STOCKS AND SHARES.

Tuesday Evening.

The German peace "proposals" had the effect in the Stock Exchange of giving a decided stimulus to business and leading to a remarkable rise in rubber shares. Concurrently there came a general fall in securities likely to be affected unfavourably by the conclusion of peace; iron, coal, and steel shares in particular. The railway market has been assisted towards recovery by a vivid rise in the price of Consols. Part of this rally in the Funds was subsequently lost, but railway stocks maintained their prices, and the Underground Electric Railways of London shows up well amongst the others. Metropolitans, however, are ¼ down. London and Suburban Traction ordinary fell to 3s. 6d. and the preference to 8s. 6d.

Electricity supply shares look a harder market, as the Stock Exchange phrases it. Citys, Countys, and London Electrics all show improved quotations. With the eagerness to discount what may happen at the end of the war, the supporters of this market are hopeful of attention being directed to its shares. Several of the manufacturing issues are better; Edisons have recovered to 16s. 9d. as an example. Considerable interest has been aroused by the prospectus of the Newcastle-on-Tyne Electric Supply Co. The shares make an attractive industrial investment, and the prices of the existing ordinary and preference have been advanced to 22s. 6d. and 20s. respectively.

Marconis have come back sharply. Peace prospects again. The ordinary gave way ⅜ to 4½ and Americans to 31s. 6d. The latter were 33s. 9d. just lately. Marconi Marines fell from 3¾ to 3½, and Canadians, which shared but moderately in the recent boom, eased off to 15s. Probably the previous rise was overdone to some extent, and the buyers thought it prudent to shorten sail. Otherwise the end of the war might be supposed to open a new vista of prosperity to the wireless undertakings, although they will lose, of course, the Government war orders that are expected to materialise so profitably for the Marconi Company.

Fraser & Chalmers reacted along with others of their class, the price going back to 31s. 3d. Armaments have weakened materially; those operators who had big profits in this market electing to take what they could, and put the money into rubber shares. The rubber market is familiarised with violent changes, but there have been few so dramatic as the

complete alteration from dulness and stagnation to buoyancy and activity which has taken place during the past few days. The market seemed to go mad with feverish bullishness, and buyers paid prices that a fortnight ago would have been scorned as ridiculously inflated. The inevitable reaction followed.

With many other Brazilian descriptions, Brazil Tractions have spurted because of the advance in the rate of the Rio exchange. Foreign stocks and shares are generally better. The Mexican Utilities braced up substantially under the cheering influence of brisk rises in practically all the stocks of the various railways operating in Mexico. The Argentine group is also better, and interest has begun to stir in some of the lesser-known foreign electricity shares and bonds. The latest intensified War Bonds campaign has placed little check upon the eagerness shown by speculative investors to buy anything that looks cheap, whether it pays a dividend or not. Manifestly there is plenty of money about, and wide scope for the energies of the Publicity Committee in charge of the War Bonds appeal.

Telegraphs are a good market, with the exception of Great Northerns, the price of which gave way sharply to 35. Easterns, Eastern Extensions, and Western Telegraphs all show improvements, demand still being eager for stocks upon which dividends are paid tax free. Oriental Telephones rose 5s. Callender's are dull, the new issue of shares being decidedly unexpected, but the preference advanced 10s. to £5, in consequence of the proposal to increase the dividend. Telegraph Constructions again rose £1. Babcock and Wilcox weakened with other engineering shares. British Insulated are a good market at 2½, and improvements have occurred in General Electric ordinary and preference.

## SHARE LIST OF ELECTRICAL COMPANIES.

| | Dividend 1916. | Dividend 1917. | Price Oct. 8, 1918. | Rise or fall. | Yield p.c. |
|---|---|---|---|---|---|
| **Home Electricity Companies.** | | | | | |
| Brompton Ordinary | 9 | 10 | 6¾ | — | £7 17 6 |
| Charing Cross Ordinary | 5 | 4 | 3⅜ | — | 6 8 0 |
| do. do. do. 4½ Pref. | 4½ | 4½ | 3¾ | — | 6 18 6 |
| Chelsea | 3 | 5 | 3 7/16 | — | 7 16 10 |
| City of London | 8 | 8 | 11½ | + ⅜ | 6 16 2 |
| do. do. 6 per cent. Pref. | 6 | 6 | 10 | + ¼ | 6 0 0 |
| County of London | 7 | 7 | 10 | + ⅜ | 7 0 0 |
| do. do. 6 per cent. Pref. | 6 | 6 | 9¼ | — | 6 3 1 |
| Kensington Ordinary | 6 | 7 | 5⅜ | — | 6 17 7 |
| London Electric | Nil | Nil | 1⅜ | + ⅛ | Nil |
| do. do. 6 per cent. Pref. | 4 | 5 | 3⅝ | + ¼ | 7 2 10 |
| Metropolitan | 3 | 4 | 3 1/16 | — | 6 10 7 |
| do. 4½ per cent. Pref. | 4½ | 4½ | 3½ | — | 6 18 6 |
| St. James' and Pall Mall | 8 | 9 | 6¾ | — | 6 18 6 |
| South London | 5 | 5 | 3 | — | 6 13 4 |
| South Metropolitan Pref. | 7 | 7 | 20/6 | — | 6 16 7 |
| Westminster Ordinary | 7 | 9 | 6¾ | — | 7 7 0 |
| **Telegraphs and Telephones.** | | | | | |
| Anglo-Am. Tel. Pref. | 6 | 6 | 99½ | — | 6 0 6 |
| do. Def. | 1½ | 1½ | 23½ | — ½ | 6 9 0 |
| Chile Telephone | 8 | 8 | 7½ | — | 5 6 8 |
| Cuba Sub. Ord. | 7 | 7 | 10½ | — | *6 13 4 |
| Eastern Extension | 8 | 8 | 16 | + ⅜ | *5 0 0 |
| Eastern Tel. Ord. | 8 | 8 | 160½ | +2 | *4 19 8 |
| Globe Tel. and T. Ord. | 7 | 7 | 14½ | — | *4 16 5 |
| do. do. Pref. | 6 | 6 | 10½ | + ⅛ | 5 17 1 |
| Great Northern Tel. | 24 | 22 | 35 | —3 | 6 5 8 |
| Indo-European | 13 | — | 57½ | — | 5 12 6 |
| Marconi | 15 | 20 | 4½ | — ⅜ | 4 9 0 |
| Oriental Telephone Ord. | 10 | 10 | 8⅜ | + ¼ | 2 19 4 |
| United R. Plate Tel. | 8 | 8 | 7½ | — | *5 3 3 |
| West India and Panama | 6d. | 1/3 | 1½ | — | *3 6 8 |
| Western Telegraph | 8 | 8 | 16⅞ | + ⅛ | *4 14 10 |
| **Home Rails.** | | | | | |
| Central London Ord. Assented | 4 | 4 | 62½ | — | 6 8 0 |
| Metropolitan | — | 1 | 26 | — ½ | 3 17 0 |
| do. District | Nil | Nil | 25 | — | Nil |
| Underground Electric Ordinary | Nil | Nil | 3½ | + ⅛ | Nil |
| do. do. "A" | Nil | Nil | 7/9 | +9d. | Nil |
| do. do. Income | 6 | 4 | 85½ | +1 | *4 13 8 |
| **Foreign *Trams, &c.** | | | | | |
| Adelaide Sup. 6 per cent. Pref. | 6 | 6 | 47 | — | 6 6 4 |
| Anglo-Arg. Trams. First Pref. | 5½ | 5½ | 32 | + ⅛ | — |
| do. do. 2nd Pref. | 5½ | — | 2½ | + ⅛ | — |
| do. do. 5 Deb. | 5 | 5 | 71 | +3 | 7 0 10 |
| Brazil Tractions | — | — | 56 | +5 | — |
| Bombay Electric Pref. | 6 | 6 | 102 | — | 5 11 7 |
| British Columbia Elec. Ry. Pfce. | 5 | 5 | 59½ | +1 | 8 8 0 |
| do. do. Preferred | Nil | Nil | 41½ | — | Nil |
| do. do. Deferred | Nil | Nil | 87½ | +1 | Nil |
| do. do. Deb. | 4½ | 4½ | 59½ | +2 | 7 2 10 |
| Mexico Trams 5 per cent. Bonds | Nil | Nil | 55 | +5 | Nil |
| do. 6 per cent. Bonds | Nil | Nil | 44 | +2 | Nil |
| Mexican Light Common | Nil | Nil | 32 | +4 | Nil |
| do. Pref. | Nil | Nil | 44½ | +4½ | Nil |
| do. 1st Bonds | Nil | Nil | 66 | +4½ | — |
| **Manufacturing Companies.** | | | | | |
| Babcock & Wilcox | 15 | 15 | 32 | — ½ | 4 0 0 |
| British Aluminium Ord. | 10 | 10 | 14 | — | 5 6 8 |
| British Insulated Ord. | 20 | 20 | 92 | + ½ | 4 4 2 |
| British Westinghouse Pref. | 7½ | 7½ | 26 | — 1/16 | 5 14 1 |
| Callenders | 20 | 25 | 10½ | — | 5 19 1 |
| do. 5 Pref. | 5 | 5 | 5 | + ½ | 5 0 0 |
| Castner-Kellner | 22 | 20 | 81 | — | 5 8 4 |
| Edison-Swan, "A" | — | — | 3/16 | — | Nil |
| do. do. 4 per cent. Deb. | 4 | 4 | 75½ | — | 5 6 0 |
| Electric Construction | 7½ | 10 | 14 | — | 7 5 6 |
| Gen. Elec. Pref. | 6 | 6 | 102 | + ½ | 6 2 4 |
| do. Ord. | 10 | 10 | 18½ | + ½ | *5 6 8 |
| Henley | 25 | 25 | 24 | — | 5 11 2 |
| do. 4½ Pref. | 4½ | 4½ | 4 | — | 5 12 6 |
| India-Rubber | 10 | 10 | 17½ | — | *5 16 9 |
| Telegraph Con. | 20 | 20 | 48½ | +1 | *5 0 0 |

*Dividends paid free of Income Tax.

## MARKET QUOTATIONS.

It should be remembered, in making use of the figures appearing in the following list, that in some cases the prices are only general, and they may vary according to quantities and other circumstances.

### Wednesday, October 9th.

| CHEMICALS, &c. | | Latest Price. | Fortnight's Inc. or Dec. |
|---|---|---|---|
| a Acid, Oxalic | per lb. | 1/6 | .. |
| a Ammoniac Sal | per ton | £100 | .. |
| a Ammonia, Muriate (large crystal) | " | £77 | .. |
| a Bisulphide of Carbon | " | .. | .. |
| a Borax | " | £43 | .. |
| a Copper Sulphate | " | £84 | .. |
| a Potash, Chlorate | per lb. | 2/4 | .. |
| a " Perchlorate | " | 2/- | .. |
| a Shellac | per cwt. | £17 10/- | 5/- inc. |
| a Sulphate of Magnesia | per ton | £15 | .. |
| a Sulphur, Sublimed Flowers | " | £24 | £1 dec. |
| a " Lump | " | £16 | £2 dec. |
| a Soda, Chlorate | per lb. | 1/1 | .. |
| a " Crystals | per ton | 17s/- | .. |
| a Sodium Bichromate, casks | per lb. | .. | .. |
| **METALS, &c.** | | | |
| c Brass (rolled metal 5" to 12" basis) | per lb. | .. | .. |
| c " Tubes (solid drawn) | " | .. | .. |
| c " Wire, basis | " | .. | .. |
| c Copper Tubes (solid drawn) | " | 1/8½ to 1/9 | |
| g " Bars (best selected) | per ton | £161 | .. |
| g " Sheet | " | £161 | .. |
| g " Rod | " | £161 | .. |
| d " (Electrolytic) Bars | " | £137 | .. |
| d " " Sheets | " | £161 | .. |
| d " " Wire Rods | " | £145 | .. |
| d " " H.C. Wire | per lb. | 1/5⅜ | .. |
| f Ebonite Rod | " | 3/- | .. |
| f " Sheet | " | 2/6 | .. |
| n German Silver Wire | " | 2/6 | .. |
| h Gutta-percha, fine | " | 6/10 | .. |
| h India-rubber, Para fine | " | 3/2 | 2d. dec. |
| i Iron Pig (Cleveland warrants) | per ton | Nom. | .. |
| l " Wire, galv. No. 8, P.O. qual. | " | £37 | .. |
| g Lead, English Pig | " | .. | .. |
| g Mercury | per bot. | Nom. | .. |
| e Mica (in original cases) small | per lb. | 6d. to 8/- | .. |
| e " " " medium | " | 8/6 to 6/- | .. |
| e " " " large | " | 7/6 to 14/- & up. | .. |
| d Silicium Bronze Wire | per lb. | 1/10 | .. |
| r Steel, Magnet, in bars | per ton | .. | .. |
| g Tin, Block (English) | " | .. | .. |
| n " Wire, Nos. 1 to 16 | per lb. | 5/- | .. |

Quotations supplied by—

a G. Boor & Co.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.
g James & Shakespeare.
h Edward Till & Co.
i Bolling & Lowe.
l Richard Johnson & Nephew, Ltd.
n P. Ormiston & Sons.
r W. F. Dennis & Co.

**Conductors for River Span.**—A 66,000-volt transmission line, 7½ miles in length, connects the Powerdale station of the Pacific Power and Light Co. to the Conduit station of the North-Western Electric Co., and makes possible interchange of power between any combination of three companies. An article in the *Electrical Review*, Chicago, describes the line construction and the use of telephone and earth wires for transmitting energy in case of emergency. The river crossing requires three steel towers, one of which is on a rock that is in itself 126 ft. above high water. The centre tower is 220 ft. high, and the two spans are 1,993 ft. and 623 ft. (2,616 ft. total). The conductors at the crossing comprise six ⅜-in., 19-strand special high-strength steel cables. Normally three of these are used for power transmission, two for telephone purposes, and one as overhead earthed conductor; but in case of a fault or breakdown on one line, the jumper connections may be altered so as to restore the service through either the earth wire or one of the telephone cables.

**Standards for Empire Trade.**—A meeting recently took place between the Prime Ministers of Canada, Australia, New Zealand, and Newfoundland, and certain representatives of the Federation of British Industries, to discuss questions relating to the standardisation of the laws and procedure affecting British trade, and the form of British products (such as machinery, engineering products, and building materials), throughout the Empire. The first subject of discussion was the desirability of establishing throughout the Empire a standard form of the declaration which British manufacturers must make to secure the advantage of preferential Customs rates. A model form of declaration has now been drawn up by the Federation. The discussion with regard to the standardisation of laws and regulations affecting the form of British products disclosed many difficulties, owing to the great diversity of legislation, federal, State, municipal, and otherwise, and the conclusion reached was that though the subject is one of great importance, it can hardly be dealt with as a whole, but can best be approached through the medium of the British Engineering Standards Association and its oversea committees, whose work is directly affected by the diversity of legislation. The co-operation of the British Standards Association is being invited for the purpose.—*The Times.*

## UTILISING WASTE HEAT, AND THE FUEL SHORTAGE.

Most of us view with concern the effect of the fuel rations, and are devising various schemes by which our supplies of coal and gas may be augmented or supplemented.

A large untapped source of heat of which little use has been made hitherto, and which costs nothing, is to be found in the waste heat of internal-combustion engines, in which, as is generally known, some 70 per cent. of the total heat of combustion is carried off by the exhaust gases and water jackets; although there are many hundred thousand gas and oil engines in the United Kingdom, the use of their waste heat has been confined to a very limited number of installations.

Some details of a system which has been devised by Mr. F. A. Wilkinson, M.I.E.E., M.I.Mech.E., of Hatfield, Herts, for heating his house in conjunction with his electric lighting plant, will be of interest. In effect, it comprises the connection of the exhaust piping, which is fitted with a patented silencing device, to lengths of pipes in the rooms in such a manner that the temperature can be regulated, while, in addition, a branch pipe is taken to the kitchen, heating a jacketed cooking range, which is also fitted with electric heating elements. The piping from the water jacket of the engine is run to hot-water radiators, and terminates in the bathroom. Electric radiators will absorb any surplus electrical energy that will be generated on very cold days.

The electric lighting plant is normally run at a load of about three kilowatts, and can be started by hand or from the house by means of the battery, which is of 200-ampere-hour capacity, at a pressure of 50 volts.

There are six rooms heated by means of the exhaust gases and water from the jacket of the engine; a bath of hot water can be obtained in eight minutes direct from the engine, and when desired by-passed through the radiators. The installation has cost little to carry out, as the piping is ordinary gas barrel; in view of the difficulty of obtaining hot-water radiators, these are composed of lengths of piping made in rectangular form and fixed to the walls.

In mid-winter the plant is run about 1½ hours per day, and the time of running can be chosen to suit that when the baths are required.

Mr. Wilkinson is installing a controlling thermostat, by means of which the engine will be started and stopped automatically.

The system of utilising the waste exhaust gases for cooking purposes is of especial interest. An ordinary electric oven is employed, fitted with electric heating elements in the usual manner. It is of cast-iron lagged with slag wool, and is one of Mr. Wilkinson's design. A receptacle is placed in the bottom of the oven, which is directly connected through a valve to the exhaust piping, while the boiling elements comprise hollow rings through which the exhaust gases pass. In the centre of the rings are fitted electric heating elements, which can be used either in conjunction with the waste heat or separately when the engine is not running.

The inside dimensions of the oven are 13 in. wide by 13 in. deep by 20 in. high. A cooking temperature can be obtained from waste heat in 35 minutes, whereas when heating up by electrical energy a consumption of 1,350 watts is required for 50 minutes. Obviously better results would be obtained from a properly designed jacketed oven, but the difficulty in obtaining such an article at the present time prevents its adoption.

There are aspects of this scheme that make one wonder whether the proposed system of supplying the country with electrical energy from huge power stations may not with advantage be modified, at all events, for small residential towns and for groups of buildings that are close together, where internal-combustion engines could supply the electrical energy as well as the heat and hot-water supply, and could be run cheaply on tar oils or heavy fuel.

The use of tar oil, which is a home-produced fuel, at its present cost of £4 10s. per ton, or 5d. per gallon, has opened up an entirely new field for small internal-combustion engines, which can be run satisfactorily on this heavy fuel with a minimum of alteration, as described in our issue of August 9th last.

The fact that the capital cost of an ordinary engine is so much lower than that of a Diesel or semi-Diesel engine, and its extreme simplicity, are points not to be lost sight of.

## THE DUTIES OF THE PROGRESS DEPARTMENT.

By W. J. HISCOX.

(*Continued from page* 334.)

The Machine Shop—The Inspection Department.

(*k*) *The Machine Shop.*—This is the pre-eminent department of the factory, and in consequence claims the greatest share of the Progress Department's attention. This department has a tremendous influence on the output of the factory, the reason being that it has to deal with (in varying degrees) fully 98 per cent. of the whole of the component parts. Many of these component parts have to pass through long and varied operations, and the Progress Department, therefore, has to be closely associated with the activities of the machine shop in order to cope with the multitudinous situations which arise in connection with the production of these parts.

Although the machine shop may be said to be virtually the home of the progress man, it does not mean that he is domiciled there, or even spends the greater portion of his time inside the department, for his interests in connection with the other departments of the factory have to be considered. The Progress Department, however, is so involved in the problem of machine-shop production that personal representation is necessary, and so the progress chaser is installed in the department, and this individual, representing the progress man, must see that the parts go through the shop in proper sequence, from operation to operation, guarding against delays, and ensuring that the whole of the details in connection with any one order are completed by the date given on the programme.

The machine shop has to depend upon other departments for its supplies of raw material, bar material from the stores, castings from the foundry, &c., and the progress chaser must see that these supplies are in the machine shop early enough to permit of the complete machining being accomplished by the date given, any delay in this connection being reported to the progress man concerned.

The art of the progress man, and also of the progress chaser, consists in arranging for the completion of the whole of the details in connection with any one order by a certified date, irrespective of the number of operations involved. The progress man studies this from a broad aspect, and arranges for the completion date of each department to permit the complete unit being dispatched by the date required. The machine-shop progress chaser has to perform the same duty, within the confines of his department, by ensuring that the whole of the component parts are completed by the date given to that department in connection with any specific order.

In order to allow the machine-shop section foreman to grasp the importance of any particular part, the chaser should, each morning, compile a priority list for every section foreman in the department, showing exactly what work in each section requires preferential treatment, and this list should be amended by the chaser if other work of an important character is received in the section during the day. This list would be of great benefit to the foreman, as, with the hundreds of parts on various orders in his section needing attention, it is impossible for him always to know the exact sequence in which the jobs are to be put in hand, unless the necessary information is given, whilst it also ensures for the chaser that the parts in which he is particularly interested are being (or will be) attended to. This applies especially to small details, which are apt to be overlooked by the departmental officials, whose attention is absorbed in the task of producing parts of greater magnitude.

The machine shop progress chaser must see that sufficient work is always in the department to keep the whole of the machines fully employed, and he must advise the Progress Department when he considers a shortage is likely to occur. If business is brisk, and the Progress Department is working on the right lines, this possibility is very remote, the delivery dating system guarding against this to a very great extent. Still, it does happen that a certain type of machine occasionally gets ahead of its commitments, and it is in this respect that the chaser must look ahead, and take the necessary steps (by reporting early enough) to ensure the trouble being obviated at the earliest possible moment. The ideal principle to work on is for each machine to have one job in operation, a second job standing by to follow on, and a third job (in the sub-store or elsewhere) to follow in sequence. If this procedure is adopted, there need be little fear of a possible shortage not being reported early enough.

Whilst priority must be accorded to the urgent production orders in the machine shop, the fact that the bulk of component parts covered by stock orders has to be dealt with in this department must not escape notice, and in concerns which maintain a large stock of such parts, for use in connection with rapid production, a special chaser should have charge of this line in the machine shop. He will work in accordance with the store's requirements, and any question of priority arising in connection with an urgent stock part and a part required on a production order must be referred to the Progress Department. It must be remembered that many parts covered by stock orders are actually required for urgent customers' orders, but as the shortage of available stock required in connection with any one order has already been reported to the Progress Department by the stores (as instanced in the article dealing with the general store), the progress man concerned will pass this information on to the chaser, who will thereupon accord the part in question the necessary preferential treatment to ensure a quick delivery.

It will thus be seen that in connection with the machine shop the progress man (assisted by the chaser) has a never-ending duty to perform, for in no point whatever must this department be neglected. Failure on the part of the department concerned to deliver material supplies by the programme date must be promptly reported by the chaser, and machine breakdowns, non-receipt of the necessary tools, work held up in transit, and all other matters affecting the completion date for the department, must also receive his prompt attention.

(*l*) *The Inspection Department.*—Although this department is connected with every productive department in the factory, it is more closely associated with the machine shop than with any other department, and it is proposed, therefore, to deal with it at this stage, for the purpose of showing its connection with the Progress Department.

It is not considered advisable for the Progress Department to issue a separate delivery date with respect to this department, on account of the many times a specific detail may have to pass through the inspector's hands before reaching its final stage; but it must be understood by all concerned that a delivery date given for the guidance of any department must cover time for inspection. The departmental chaser is, therefore, responsible for getting the details through the Inspection Department, treating the inspection of the article as an operation in connection with the department in which he is interested.

The inspector, like the toolmaker, must be allowed adequate time in which to do his work efficiently; but there is no reason why he should not work the details through in strict order of priority. A good idea is to have a list displayed in a prominent position in the department, similar to the one recommended for the use of the section foreman in the machine shop, recording the order of precedence in which the details are required, such list to be amended by the chaser as further items arrive in the department, and modified when they are completed. The list could be changed daily, and the inspector would have the assurance that he was working in connection with the most important parts, from a delivery point of view.

When an article is rejected, or returned to the shop for rectification a copy of the inspector's report on the subject should be promptly sent to the Progress Department, to enable the progress man interested to take the necessary steps which will ensure the replacement, or the operation necessitated by the rectification, being completed with a view to minimising any delay with regard to the completion date on programme. A record of all rejections should be kept by the Progress Department in connection with any specific order, as this will be found most useful in compiling the report necessitated by the delays occasioned in connection with the order.

*(To be concluded.)*

## TRADE OF SOUTH AFRICA.

A report on the trade of South Africa for the year 1917 from the pen of H.M. Trade Commissioner (Mr. Wickham) has just been issued by the Department of Overseas Trade.

Mr. Wickham gives first place to the steps taken in connection with the development of national industry, viz.:—

1. The first census of industrial production.
2. The formation of a Federation of Industries.
3. The formation of the Industrial Development Co., Ltd., for financing new industrial enterprises.
4. The operations of the Industries Section of the Department of Mines and Industries.
5. The flotation of companies to establish vitally important primary industries, notably the production of iron.

*New Industries.*—The following among the new industries which have recently been, or are on the point of being, established, will be of interest to the electrical trades:—

Manufacture of carborundum, calcium carbide, alcohol motor fuel, asbestos sheet and goods, casting shoes and dies (of steel from electric furnaces), refining of arsenic and antimony, tin smelting.

Undoubtedly, by far the most important of all the Union's industrial developments, the success of which must be awaited with interest, is the iron industry. Two companies are erecting blast furnaces, one at Pretoria, and the other at Vereeniging. It is understood that one of the chief difficulties in this way is the rarity of a good coking coal. Coke, consequently, has hitherto been expensive, and the supply barely adequate for the foundries. Very considerable extensions have been brought about recently.

*Public Works.*—As regards municipal enterprises, in the case of electricity, normal expansion has had to stop, all the more important municipal generating stations being already fully loaded, and some actually overloaded, and additional plant on order being unprocurable or, at least, delayed. The same consideration applies to the telephone service, for which new instruments are unobtainable. Copper cable has, of course, been on the list of prohibited exports from the United Kingdom for some time, and this fact has given the Japanese a chance of having their cable tested in use by the Post and Telegraph Department, mines, and public bodies. The accumulation of overdue orders and of postponed development in regard to electricity, water supply, and sanitation will probably, by the time normal trade conditions are once more in sight, represent a very large amount of business. This is equally true of mining, since, while production is being pressed on, both development work and the opening up of new enterprises are being largely postponed.

*Mining Supplies.*—In connection with mining requirements an important alteration in purchasing procedure has been introduced. The contracting for goods from oversea for the mines has been focused in one buyer's hands. This system has been adopted because it was found in the early days of the war that material for the mines, other than special machinery and apparatus, was being accumulated by merchants, manufacturers' agents, and mines engineers and storekeepers to an extent which was not merely uneconomical, but was also improper having regard to the need for the manufacture of such goods being limited to what was actually essential to the carrying on of the mining industry. Stocks have now been reduced to a minimum without risk of exhaustion. The possibility of this centralised buying continuing after the war has to be faced. Another factor which is likely to have a still greater effect on trade with the mines, is the possibility of the successful local production of pig-iron. Cheap coal, lime, and high-grade supply is available in the gold mining area, against which imported goods have a long expensive haul 500 miles from the coast.

*Imports Last Year.*—The imports of all classes of machinery and hardware, with the exception of mining machinery and tools, have been very much affected by the war, but even here the fall in 1917 is more pronounced than in the previous years. The reduction of imports under the head of iron and steel and machinery—mining machinery being practically the only exception—is explained by war necessities and prices, but a very great deal of it may also be regarded as deferred expenditure which must be undertaken at as early a date as possible. The following are some of the more notable items of decrease in imports into South Africa:

*Machinery, electrical.*—The pre-war value of £451,000

(of which a little more than half was German) falls to £150,000. Agricultural and water-boring machinery, cranes and lifts, fire and traction engines, manufacturing and printing machinery, and pumps alike show a big falling off. Similarly, rails, both light and heavy, and locomotives and rolling stock have been imported in very much smaller quantities—the imports of British as well as, of course, German, makes being much reduced, while the remains of the business were left practically to the United States. It may be noted that light rails are now being rolled on the Witwatersrand.

*New Competition.*—The expansion of Japanese trade with South Africa has been more marked and continuous, though even now Japan's total imports into South Africa are less than those of Sweden. The range of goods which Japan is now exporting is, however, interesting, and it would be most unwise to discount her initiative or minimise her potentialities as a competitor. At the same time, it must not be taken for granted that Japan has been completely successful in the manufacture of all this wide range, or that Japanese makers will hold the field indefinitely, even at lower prices, unless quality is very much improved. It is noticeable that, at present, machinery and hardware, with the exception of cheap cutlery, are hardly represented in the list. An agency for electric cable and wire (plain and insulated) has been placed in the hands of a Johannesburg firm, but the import statistics for 1917 do not record any shipments as having arrived.

Increases are recorded to the credit of Japan in imports of brass manufactures and electric fittings (probably insulators). Denmark and Holland, too, are credited with satisfactory business in machinery for manufacturing purposes.

The most noteworthy gains made by Canada in contributing to the import trade of the Union are in hardware.

The American share of the machinery trade is very much larger than that of Canada, being more than one-half of the total. In iron and steel manufactured goods, imports from the United States increased by £250,000. To this amount must be added £45,000 increase in fencing and baling wire, and £13,000 in railway material, South Africa having had to depend almost entirely on the United States both for light railway material and wire, instead of Germany, which had an important share of both trades.

*Selling Methods.*—Reference may be made to a system of representation which appears to be excellent, and particularly well devised for any class of goods, such as machinery, for the selling of which technical knowledge is desirable, if not essential. Reference has often been made to the difficulty of finding agents with adequate technical knowledge for negotiating with buyers of machinery. The necessity of finding a trained man to represent manufacturers of goods which are to be sold to customers who are themselves technical experts, has led some firms to send out their own man or staff. Where the market is comparatively small, it may be that the turnover of one manufacturer would hardly be sufficient to pay the cost of such a selling branch. To get over this difficulty, firms secure the representation of other manufacturers of kindred, but not conflicting, lines which can be handled efficiently and with little, if any, additional effort or outlay by the same agency. This is to all intents and purposes the system which has been recommended on previous occasions, namely, co-operative selling through organisation of groups of manufacturers. It is a system which brings the manufacturer into touch with, and knowledge of, his market efficiently and with economy; and particularly for those who find difficulty in finding agents with the qualifications that are necessary, it is to be recommended.

Manufacturers of machinery tend to specialise on a type of product. "Boilers for all purposes," "Centrifugal machinery of all kinds," "Pulverising and grinding machinery for all industries," are samples of titles from machinery catalogues. A firm makes grinding machinery for making cement, for pulverising bones, for a chemical works, &c., but does not touch the drying or burning plants required for the same purpose, or the prime movers. It may be that this specialisation on one class of machine results in a more perfect product for particular purposes than the product of a works specialising on, say, cement-making plant, and confining attention entirely to that particular purpose for each particular part of the complete plant. Whether such is the case or not, attention is called to the need for considering the difficulty involved in selling overseas when no one of the makers of plant is in a position to draw up a specification or working drawings of a complete plant. It is all very well as regards the home market to rely on getting orders for individual machines or apparatus to take their place in existing factories and works, or to depend on a consulting engineer to do the assembling of 10 or a dozen items into a complete specification. It is, however, very far from being an ideal system for oversea business, and very much business has gone to foreign countries just for the reason that manufacturers in so many lines do not profess to know about the manufacturing system as a whole for which they want to supply one part of the plant. In many instances it is almost impossible to arrange adequate representation, or even to interest a representative.

The advantages of specialisation on, say, vacuum pans, or drying machinery, may be very great, but it seems evident that the drawbacks are also of sufficient importance to merit study by engineering associations in order to obviate these. Some development of organisation seems to be called for. Possibly firms making pumps, air compressors, and machinery, such as are referred to above, could, in relation to each of the various purposes for which their products are used, arrange small combinations of the makers of all different items going to make up a complete plant with a joint drawing office and selling organisation. Possibly firms of structural engineers who already undertake much work of assembling could cover the whole ground of industrial plant more completely, and so fill a gap. That there is a gain anyone who looks into the matter cannot seriously doubt.

The above notes refer to industrial machinery in general use, and not to mining machinery. The mines constitute a market in themselves, the requirements of which are met by a special and highly-organised system of distribution, to which reference has already been made.

*System of Agency.*—Nowadays, if manufacturers want permanent business, they must establish permanent relations with the consumer. They must keep in direct touch with their market in a way that they can only do through a local trading branch of their own, or through a loyal representative. For smooth working, for efficiency, for economy, or for successful pushing of new lines there is only one course. There must be representation, with a recognition of common interests, as well as mutual goodwill and confidence.

Before concluding his report, H.M. Trade Commissioner suggests that very much more useful work could be done if manufacturers in the United Kingdom would more freely indicate directions in which they want help, and the class of information which is of value.

## TRADE STATISTICS OF SOUTH AFRICA.

The following statement, showing the imports of electrical and similar goods into the Union of South Africa during the year 1917, has been taken from the recently-issued official trade statistics. The figures for 1916 are added for purposes of comparison, and notes of any increases or decreases are given :—

| | 1916. £ | 1917. £ | Inc. or dec. £ |
|---|---|---|---|
| *Asbestos manufactures.*— | | | |
| From Great Britain ... | 9,000 | 4,000 | – 5,000 |
| ,, Other countries ... | 2,000* | 1,000 | – 1,000 |
| Total ... ... | 11,000 | 5,000 | – 6,000 |
| * Switzerland £1,000. | | | |
| *Brass manufactures.*— | | | |
| From Great Britain ... | 24,000 | 17,000 | – 7,000 |
| ,, United States ... | 2,000 | 2,000 | — |
| ,, India ... ... | 2,000 | 1,000 | – 1,000 |
| ,, Other countries ... | — | 3,000* | + 3,000 |
| Total ... ... | 28,000 | 23,000 | – 5,000 |
| * Japan £2,000. | | | |
| *Copper, plate and sheet.*— | | | |
| From Great Britain ... | 4,000 | 1,000 | – 3,000 |
| ,, United States ... | — | 1,000 | + 1,000 |
| Total ... ... | 4,000 | 2,000 | – 2,000 |
| *Copper manufactures.*— | | | |
| From Great Britain ... | 3,000 | 1,000 | – 2,000 |
| ,, United States ... | 1,000 | 3,000 | + 2,000 |
| ,, Other countries ... | — | 1,000 | + 1,000 |
| Total ... ... | 4,000 | 5,000 | + 1,000 |
| *Electrical cable and wire.*— | | | |
| From Great Britain ... | 228,000 | 42,000 | – 186,000 |
| ,, Italy ... ... | 1,000 | 1,000 | — |
| ,, United States ... | 5,000 | 10,000 | + 5,000 |
| ,, Other countries ... | 3,000* | 1,000 | – 2,000 |
| Total ... ... | 237,000 | 54,000 | – 183,000 |
| * Holland £3,000. | | | |
| *Electrical fittings, including posts.*— | | | |
| From Great Britain ... | 200,000 | 110,000 | – 90,000 |
| ,, Canada ... ... | 1,000 | 1,000 | — |
| ,, Holland ... ... | 22,000 | 24,000 | + 2,000 |
| ,, United States ... | 62,000 | 61,000 | – 1,000 |
| ,, Japan ... ... | 2,000 | 6,000 | + 4,000 |
| ,, Other countries ... | 11,000* | 5,000 | – 6,000 |
| Total ... ... | 298,000 | 207,000 | – 91,000 |
| * Denmark £4,000. | | | |
| *Lamps and lampware.*— | | | |
| From Great Britain ... | 28,000 | 11,000 | – 17,000 |
| ,, United States ... | 19,000 | 15,000 | – 4,000 |
| ,, Sweden ... ... | 17,000 | 5,000 | – 12,000 |
| ,, Other countries ... | 2,000 | 1,000 | – 1,000 |
| Total ... ... | 66,000 | 32,000 | – 34,000 |

| | 1916. £ | 1917. £ | Inc. or dec. £ |
|---|---|---|---|
| *Electrical machinery.—* | | | |
| From Great Britain ... | 112,000 | 82,000 | – 30,000 |
| ,, Sweden ... ... | 3,000 | 7,000 | + 4,000 |
| ,, United States ... | 63,000 | 61,000 | – 2,000 |
| ,, Other countries ... | 2,000 | — | – 2,000 |
| Total ... ... | 180,000 | 150,000 | – 30,000 |
| *Cranes, elevators, and lifts.—* | | | |
| From Great Britain ... | 17,000 | 6,000 | – 11,000 |
| ,, United States ... | 2,000 | 1,000 | – 1,000 |
| Total ... ... | 19,000 | 7,000 | – 12,000 |
| *Mining machinery.—* | | | |
| From Great Britain ... | 473,000 | 461,000 | – 12,000 |
| ,, Sweden ... ... | 2,000 | 2,000 | — |
| ,, United States ... | 253,000 | 244,000 | – 9,000 |
| ,, Other countries ... | 1,000 | 4,000* | + 3,000 |
| Total ... ... | 729,000 | 711,000 | – 18,000 |
| * Canada £3,500. | | | |
| *Machinery not specially mentioned (other than agricultural, manufacturing, &c.).—* | | | |
| From Great Britain ... | 256,000 | 174,000 | – 82,000 |
| ,, Sweden ... ... | 4,000 | 6,000 | + 2,000 |
| ,, United States ... | 59,000 | 57,000 | – 2,000 |
| ,, Canada ... ... | 6,000 | 6,000 | — |
| ,, Other countries ... | 3,000 | 1,000 | – 2,000 |
| Total ... ... | 328,000 | 244,000 | – 84,000 |
| *Telegraph and telephone material.—* | | | |
| From Great Britain ... | 8,000 | 6,000 | – 2,000 |
| ,, Sweden ... ... | 2,000 | 1,000 | – 1,000 |
| ,, Other countries ... | 1,000 | — | – 1,000 |
| Total ... ... | 11,000 | 7,000 | – 4,000 |
| *Tramway rails.—* | | | |
| From Great Britain ... | 2,000 | — | – 2,000 |
| ,, United States ... | 4,000 | 4,000 | — |
| Total ... ... | 6,000 | 4,000 | – 2,000 |
| *Tramway rolling-stock.—* | | | |
| From Great Britain ... | 10,000 | 2,000 | – 8,000 |
| ,, United States ... | 2,000 | 1,000 | – 1,000 |
| ,, Other countries ... | 1,000 | — | – 1,000 |
| Total ... ... | 13,000 | 3,000 | – 10,000 |
| *Other tramway materials.—* | | | |
| From Great Britain ... | 2,000 | 1,000 | – 1,000 |
| ,, United States ... | 2,000 | 1,000 | – 1,000 |
| ,, Other countries ... | 1,000 | 1,000* | — |
| Total ... ... | 5,000 | 3,000 | – 2,000 |
| * Madagascar (sleepers) £1,000. | | | |

In addition to the above the following goods were imported as "Government Stores":—

| | | | |
|---|---|---|---|
| *Brassware.—* | | | |
| From United Kingdom ... | 4,000 | 1,000 | – 3,000 |
| *Copper, plate and sheet.—* | | | |
| From United Kingdom ... | 6,000 | 4,000 | – 2,000 |
| *Electrical cable and wire.—* | | | |
| From United Kingdom ... | 22,000 | 24,000 | + 2,000 |
| *Electric fittings.—* | | | |
| From United Kingdom ... | 13,000 | 6,000 | – 7,000 |
| ,, Other countries ... | 1,000 | 2,000 | + 1,000 |
| Total ... ... | 14,000 | 8,000 | – 6,000 |
| *Lampware.—* | | | |
| From United Kingdom ... | 2,000 | 2,000 | — |
| *Cranes and elevators.—* | | | |
| From United Kingdom ... | — | 3,000 | + 3,000 |
| *Electrical machinery.—* | | | |
| From United Kingdom ... | 5,000 | 2,000 | – 3,000 |
| *Other machinery.—* | | | |
| From United Kingdom ... | 7,500 | 17,000 | + 9,500 |
| ,, Other countries ... | 4,500* | 3,000 | – 1,500 |
| Total ... ... | 12,000 | 20,000 | + 8,000 |
| * United States mainly. | | | |
| *Telegraph and telephone material.—* | | | |
| From United Kingdom ... | 21,000 | 13,000 | – 8,000 |
| ,, Sweden ... ... | 5,000 | 19,000 | + 14,000 |
| ,, Other countries ... | — | 3,000* | + 3,000 |
| Total ... ... | 26,000 | 35,000 | + 9,000 |
| * United States. | | | |

## NEW PATENTS APPLIED FOR, 1918.

### (NOT YET PUBLISHED.)

Compiled expressly for this journal by Messrs. Sefton-Jones, O'Dell and Stephens (successors to W. P. Thompson & Co., of London), Chartered Patent Agents, 285, High Holborn, London, W.C. 1.

15,410. "Electric pocket flash-lamps." W. J. Woodman. September 23rd.
15,433. "Electro-magnetic switches." British Thomson-Houston Co. and H. C. Hastings. September 23rd.
15,434. "Automatic telephone systems." Automatic Telephone Manufacturing Co. September 23rd. (United States, February 4th.)
15,450. "Electric drive for ships' screw propellers." Akt.-Ges. Brown Boveri et Cie. September 23rd. (Germany, July 3rd.)
15,457. "Electric switches." R. K. Hearn. September 23rd.
15,461. "Electric contactors." British Thomson-Houston Co. (General Electric Co.). September 23rd.
15,462. "Disposition of conductors in electric distribution systems." British Thomson-Houston Co. & E. B. Wedmore. September 23rd.
15,550. "X-ray apparatus." British Thomson-Houston Co. (General Electric Co.). September 24th.
15,508. "Field magnets of dynamos and motors, and method of construction." A. H. Avery & G. Kent, Ltd. September 24th.
15,523. "Methods of treating filaments for incandescent lamps." Westinghouse Lamp Co. September 24th. (United States, October 15th, 1917.)
15,539. "Ignition apparatus." Remy Electric Co., September 24th. (United States, September 19th, 1917.)
15,541. "Spark plugs." E. J. Taylor. September 24th.
15,548. "Electric furnaces." H. Etchells, H. A. Greaves & T. H. Watson & Co. September 25th.
15,586. "Electric furnace, and method of operating same." F. T. Synder. September 25th.
15,587. "Electrodes or plates for electric accumulators of the alkaline type." W. N. Stewart. September 25th
15,592. "Alternating electric current motors." British Thomson-Houston Co. (General Electric Co.). September 25th.
15,600. "Electric furnaces." E. L. Crosby. September 25th.
15,602. "Ignition systems for internal-combustion engines." General Motors Corporation & P. C. Rushen. September 25th.
15,603. "System for instantaneous and electrical heating of water." L. E. Seimbille. September 25th. (France, September 28th, 1917.)
15,614. "System for instantaneous and electrical heating of water." L. E. Seimbille. September 25th. (France, January 28th.)
15,652. "Diaphragms." Automatic Telephone Manufacturing Co. & S. R. Smith. September 25th.
15,672. "Incandescent electric lamp holders, &c." Benjamin Electric, Ltd. September 26th. (United States, October 16th, 1917.)
15,700. "Telephone apparatus for one common line." Aktiesælskabet Electrisk Bureau. September 26th. (Norway, November 15th, 1917.)
15,701. "Ignition dynamos." C. T. Mason. September 26th.
15,709. "Electro-magnetic switches or contact makers." Soc. Anon des Etablissements L. Blériot. September 25th. (France, November 7th, 1917.)
15,714. "Utilising static and dynamic coaxial impulses generated by efflux of liquids." O. Angelini. September 26th.
15,728. "Portable electric cable controller." R. D. Fairclough. September 27th.
15,762. "Electricity meters." G. Casolini. September 27th.
15,769. "X-ray apparatus." M. B. Rodriguez. September 27th.
15,782. "Diaphragms for gramophones, phonographs, telephones, &c." A. T. Collier. September 28th.
15,794. "Electric bells." W. E. Clifton, J. H. Cowell & H. W. Cox. September 28th.
15,795. "Polishing-iron for electric or gas iron in laundry work." J. Bath. September 28th.
15,812. "Electric furnaces." T. A. D. Lawton. September 28th.
15,831. "Synchronis rs for internal-combustion steam or electric motors." N. Collins. September 28th.

## PUBLISHED SPECIFICATIONS.

The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

### 1917.

3,531. Machine switching telephone system. Western Electric Co., F. R. McBerty & L. Polinkowsky. March 10th, 1917. (118,644.)
10,244. Electric heaters. A. A. Buck. July 10th, 1917. (118,652.)
12,854. Controlling-means for electrically-operated feed reel brakes. H. V. James. September 7th, 1917. (118,681.)
13,172. Electrodes for electric furnaces and like purposes. W. B. Hamilton, H. A. Blackwell & W. L. Turner. September 14th, 1917. (118,690.)
13,191. Automatic telephone system. A. E. Stevens. September 14th, 1917. (118,691.)
13,372. Multiple-fuse cartridges for electric circuits. F. A. Feldkamp. November 6th, 1917. (111,096.)
13,425. Speed-controlled electrically-operated machines. H. H. Jeffcott. September 19th, 1917. (118,694.)
13,741. Electrical transmission arrangements specially applicable for motor-vehicles. W. A. Stevens & J. Sankey & Sons. September 24th, 1917. (118,699.)
14,824. Telegraphic apparatus. C. Domanico. October 12th, 1917. (118,716.)
14,976. Means for the production and control of current for X-ray tubes. G. Pearce & F. D. Owen-King. October 16th, 1917. (118,720.)
15,404. Electric clocks. W. G. Kent & L. W. Pullman. October 23rd, 1917. (118,726.)
16,136. Electric accumulator boxes. C. R. D. Pritchett & Pritchett and Gold & Electrical Power Storage Co. November 5th, 1917. (118,733.)
16,439. Aerodrome lighting for the landing of aircraft. J. I. Hall and Callender's Cable and Construction Co. November 9th, 1917. (118,739.)
18,700. Electric current rectifiers. H. Wade (Mills, H. S.). December 15th, 1917. (118,762.)

### 1918.

615. Electric starting-apparatus for motor-vehicle engines. H. Lucas and C. L. Breeden. January 10th, 1918. (118,775.)
951. Self-starters for internal-combustion engines. W. Holt & B. Brooks. January 17th, 1918. (118,779.)
3,267. Cord connections for electric appliances. Naamlooze Vennootschap Fabriek Van Instrumenten en Electrische Apparaten "Inventum." October 18th, 1917. (118,792.)
3,709. Slip ring short-circuiting and brush contact releasing gear. Phœnix Dynamo Manufacturing Co. & A. H. Bennett. March 2nd, 1918. (118,797.)